# 1260 VXI
# SWITCHING CARD

# Model 1260-84
# VXI OPTICAL SWITCH

**PUBLICATION NO. 980673-057**

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# Racal Instruments

## EC Declaration of Conformity

We

Racal Instruments Inc.
4 Goodyear Street
Irvine, CA 92718

declare under sole responsibility that the

**1260-84A-1 Optical Switch One Slot P/N 407692-001**
**1260-84B-1 Optical Switch One Slot P/N 407692-002**
**1260-84A-2 Optical Switch Two Slot P/N 407678**
**1260-84B-2 Optical Switch Two Slot P/N 407678-001**

conforms to the following Product Specifications:

**Safety**: EN61010-1

**EMC:** EN50081-1
CISPR 22:1990/EN 55022 (1995): Group 1 Class A
IEC 801-2:1991/EN 50082-1 (1992): 4 kV CD, 8 kV AD
IEC 801-3:1984/EN 50082-1 (1992): 10 V/m, 27-1000 MHz
IEC 801-4:1988/EN 50082-1 (1992): 1 kV

**Supplementary Information:**

The above specifications are met when the product is installed in a Racal Instruments certified mainframe with faceplates installed over all unused slots, as applicable.

The product herewith complies with the requirements of the EMC Directive 89/336/EEC.

Irvine, CA, April 6, 1999

Quality Manager

# FOR YOUR SAFETY

Before undertaking any troubleshooting, maintenance or exploratory procedure, read carefully the **WARNINGS** and **CAUTION** notices.

This equipment contains voltage hazardous to human life and safety, and is capable of inflicting personal injury.

If this instrument is to be powered from the AC line (mains) through an autotransformer, ensure the common connector is connected to the neutral (earth pole) of the power supply.

Before operating the unit, ensure the conductor (green wire) is connected to the ground (earth) conductor of the power outlet. Do not use a two-conductor extension cord or a three-prong/two-prong adapter. This will defeat the protective feature of the third conductor in the power cord.

Maintenance and calibration procedures sometimes call for operation of the unit with power applied and protective covers removed. Read the procedures and heed warnings to avoid "live" circuit points.

Before operating this instrument:

1. Ensure the instrument is configured to operate on the voltage at the power source. See Installation Section.
2. Ensure the proper fuse is in place for the power source to operate.
3. Ensure all other devices connected to or in proximity to this instrument are properly grounded or connected to the protective third-wire earth ground.

If the instrument:

- fails to operate satisfactorily
- shows visible damage
- has been stored under unfavorable conditions
- has sustained stress

Do not operate until performance is checked by qualified personnel.

**Optical Ports**

**WARNING:** To avoid eye damage, do not look directly into the optical output ports while there is an optical signal connected to the input port. Always attach the output ports to a receiver or cover with the supplied dust caps before enabling the source signal to the input port.

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# Chapter 1
# MODULE SPECIFICATION

## Introduction

The 1260-84 is a VXI Optical Switch Module developed for the Racal 1260 Series of switch modules.

The 1260-84 is available configured from the factory and can be ordered with the Option-01T Message Based Interface.

The following features are included in the 1260-84

- Single or Dual 1X4 Optical Switching.
- Available as VXI Single-wide or Double-wide C-size modules.
- Message Based Interface Option available.
- New Data Driven Model embedded firmware.
- Up to two independent optical switches. Each with a common optical port that connects to 1 of 4 channels or can be disconnected (other configurations are available as specials).
- Single Mode, 9/125μm optical fiber with a wavelength range of 1290-1570 nm standard. Optional fiber types and wavelengths are available as specials.
- FC/SPC connectors are standard (other connectors or fiber pigtails are available as specials).
- Dust Caps are supplied with all front panel Fiberoptic adapters.

**Figure 1-1, The 1260-84**

## Specifications[1]

| | |
|---|---|
| Optical Fiber Type | 9/125μm |
| Wavelength Range | 1290-1570 nm |
| Insertion Loss[2] | <1.2dB max., 0.6dB typ.<br><2.0dB max., including connectors |
| Back Reflection[2] | <-55dB max, 60dB typ. |
| Polarization Dependent Loss[3] | .05dB max. |
| Repeatability[4] | +/- .03dB max, +/- .01dB typ. |
| Isolation | 80dB max, 90dB typ. |
| Switching Time | 325msec. +16msec. per channel |
| Shock | 30g, 11msec, ½ sine wave |
| Vibration | 0.013" PK-PK, 5-55Hz |
| Bench Handling | 4in, 45° |

| | | |
|---|---|---|
| Temperature | | |
| Operating | | 0 to +50 degrees Centigrade |
| Non-operating | | -20 to +70 degrees Centigrade |
| Relative Humidity | | 90% RH Non-Condensing at ≤ 40°C for 5 days |
| Power requirements | | 5 VDC at 1.4 Amps W/Option 01T<br>5 VDC at 0.4 Amp WO/Option 01T<br>12 VDC at 0.25 Amps (1260-84A)<br>12 VDC at .50 Amps (1260-84B) |
| Cooling Requirements | | 1.0 liter/sec @ .025 $mmH_2O$ (1260-84-2)<br>1.0 liter/sec @ .12 $mmH_2O$ (1260-84-1) |
| Dimensions | Single-wide C-Size, VXIbus Module (1260-84-1)<br>Double-wide C-Size, VXIbus Module (1260-84-2) | |

| Module Weight | 1260-84A-1 | 1260-84B-1 |
|---|---|---|
| w/OPT 01T | 3.6lbs (1.63kg) | 4.7lbs (2.13kg) |
| w/o OPT 01T | 3.4lbs (1.54kg) | 4.4lbs (2.00kg) |
| | 1260-84A-2 | 1260-84B-2 |
| w/ OPT 01T | 4.0lbs (1.81kg) | 5.1lbs (2.31kg) |
| w/o OPT 01T | 3.8lbs (1.72kg) | 4.8lbs (2.18kg) |

| | |
|---|---|
| MTBF | 100,000 Hours minimum |

NOTES:

1. **All Specifications are referenced without connectors and measured at 23°C ±5°C.**
2. **Connector Insertion Loss typically less than 0.25dB, 0.4dB maximum per connector. Back Reflection less than –45dB.**
3. **Connector PDL typically less than .02dB, measured at 1550 nm.**
4. **Sequential Repeatability, 100 cycles measured at constant temperature after 1 hour warm-up**

## Ordering Information

Listed below are part numbers for both the 1260-84 switch modules and available accessories.

| ITEM | DESCRIPTION | PART # |
|---|---|---|
| 1260-84A-2 Switch Module | 1260-84A-2, Double-wide 1X4 Optical Switch | 407678 |
| 1260-84B-2 Switch Module | 1260-84B-2, Double-wide Dual 1X4 Optical Switch | 407678-001 |
| 1260-84A-1 Switch Module | 1260-84A-1, Single-wide 1X4 Optical Switch | 407692-001 |
| 1260-84B-1 Switch Module | 1260-84B-1, Single-wide Dual 1X4 Optical Switch | 407692-002 |
| 1260-84 Shipping Kit | Manual, Key Locks | 407680 |
| Additional Manual | 1260-84 User Manual | 980673-057 |

## Safety

Refer to the **"FOR YOUR SAFETY"** page preceding the Table of Contents. Follow all **NOTES, CAUTIONS,** and **WARNINGS** to ensure personnel safety and prevent damage to the instrument.

## Product Support

Racal Instruments has a complete Service and Parts Department. If you need technical assistance or should it be necessary to return your product for servicing, call 1-800-722-3262 or 1-949-859-8999 and ask for Customer Support. You may also contact Customer Support via E-Mail at:

Helpdesk@racalate.com

If parts are required to repair the product at your facility, call 1-800-722-3262 or 1-949-859-8999 and ask for the Parts Department.

When sending your instrument in for repair, complete the form in the back of this manual and enclose it with the instrument.

## About MTBF

The 1260-84 MTBF is >100,000 hours, calculated in accordance with MIL-HDBK-217E, Ground Benign Environment.

The optical switch used on the 1260-84 module is Racal part no. 602364-004. The switch manufacturer's specifications for this switch are:

| | |
|---|---|
| Switch Durability | $>10^7$ operations minimum |

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# Chapter 2
# INSTALLATION INSTRUCTIONS

## Unpacking and Inspection

1. Before unpacking the switching module, check the exterior of the shipping carton for any signs of damage. All irregularities should be noted on the shipping bill and reported.
2. Remove the instrument from its carton, preserving the factory packaging as much as possible.
3. Inspect the switching module for any defect or damage. Immediately notify the carrier if any damage is apparent.
4. Have a qualified person check the instrument for safety before use.

***CAUTION***

**Always perform unpacking, disassembly, repair, and cleaning at a static safe work station.**

## Reshipment Instructions

1. Use the original packing material when returning the switching module to Racal Instruments for servicing. The original shipping carton and the instrument's plastic foam will provide the necessary support for safe reshipment.
2. If the original packing material is unavailable, wrap the switching module in an ESD Shielding bag and use plastic spray foam to surround and protect the instrument.
3. Reship in either the original or a new shipping carton.

## Option 01T Installation

Installation of the Option 01T is described in the Installation and Setup section of the 1260A-Option 01T Users Manual, Publication No. 980806-999.

***NOTE:***

**Only install a 1260A Option 01T controller with release 7.1 or later firmware. The 1260-84 is not compatible with the older 1260 Option 01 controller.**

## Module Installation

Installation of the 1260-84 Switching Module into a VXI mainframe, including the setting of switches SW1-1 through SW1-4, SW2, and SW3, is described in the Installation and Setup Section of the 1260A Option 01T Users Manual, Publication No. 980806-999.

## Module Configuration

The 1260-84 is a 1X4 optical switch module consisting of up to two optical switch modules. Refer to **Figure 2-1** for a block diagram of the 1260-84A. The 1260-84 is available as a single 1X4, 1260-84A or as a dual 1X4, 1260-84B. Refer to **Figure 2-2** for a block diagram of the 1260-84B.

This architecture permits the 1260-84B module to be organized via software as two independent 1X4 optical switches or as a synchronous duplex 1X4 switch by use of the **INCLUDE** command (Refer to the 1260-01T User Manual). In addition, the user can configure the module as a 1X7 optical switch by connecting the common port of one switch to one of the channels of the other switch.

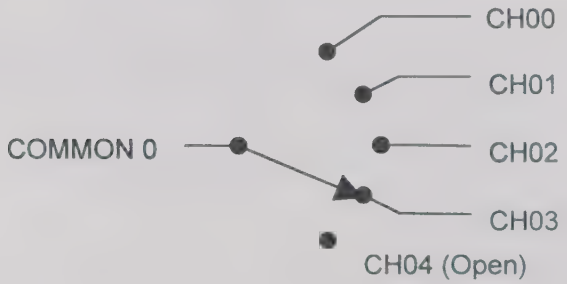


**Figure 2-1, 1260-84A Block Diagram**

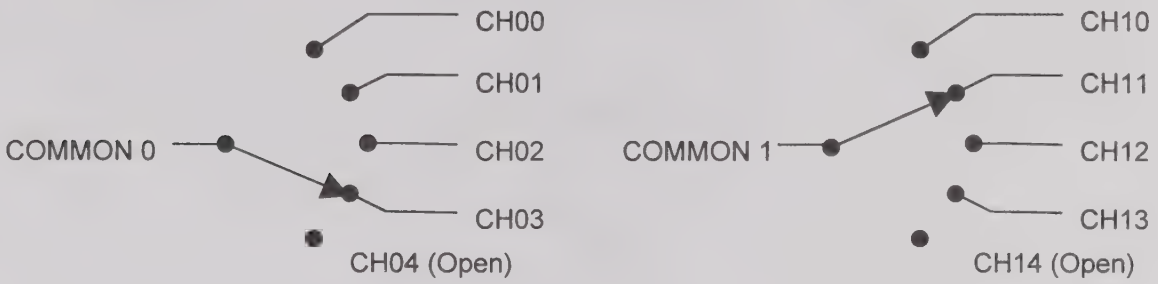


**Figure 2-2, 1260-84B Block Diagram**

## Front Panel Connectors

The 1260-84 front panel connectors are labeled as shown in **Figure 2-3 through 2-6**. The connector type is a single mode FC connector adapter.

## Fail LED

The Fail LED is available if the 1260 Option 01T Message Based Controller is installed. For further information refer to the 1260 Option 01T Users Manual, Publication No. 980806-999

## Switch Status LED

The 1260-84 provides a switch status LED (S0 or S1) for each switch installed. The status LED provides an indication of the state of the optical switch as shown below:

OFF: The optical switch is in an idle state.

Green: The optical switch is busy, in the process of switching. At power up, the status LED will default to Green, indicating power applied to the optical switch. The Green LED will turn off after a BNO (Begin Normal Operation) has been issued to the 1260-84.

Red: An Error has occurred as a result of the last command. An Error can be caused by:

a. The optical switch was commanded to a non-existent channel.

b. An internal switch error has occurred as the result of a failed home position or a stepper motor failure.

c. A Red LED at power-up indicates a possible disconnected control cable to the optical switch.

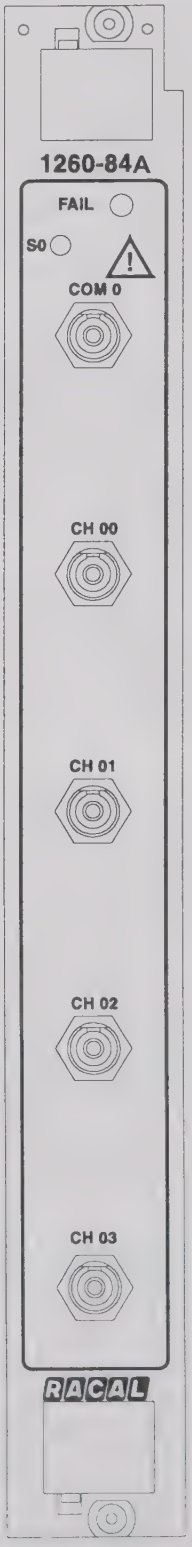


Figure 2-3 1260-84A-1 Front Panel Pin Connections, Front View

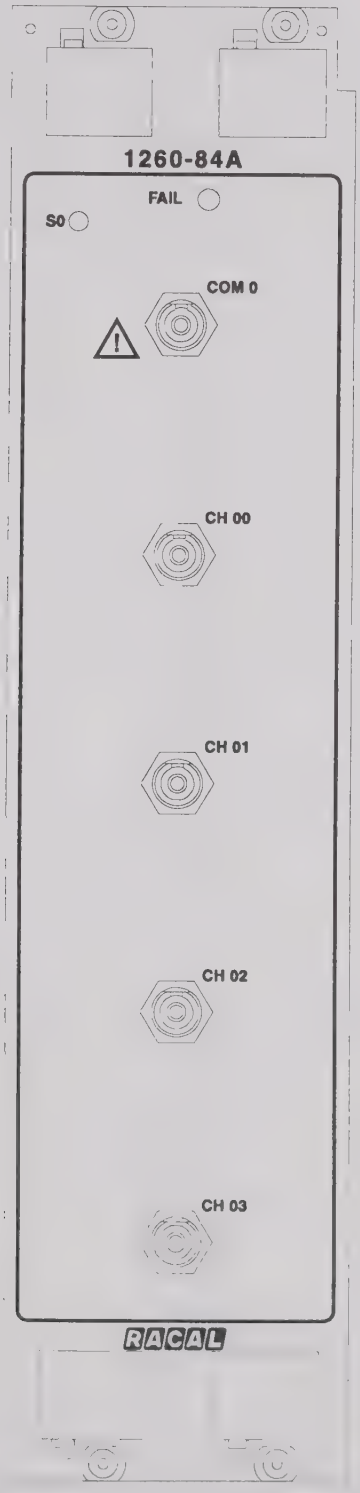


Figure 2-4 1260-84A-2 Front Panel Pin Connections, Front View

Figure 2-5 1260-84B-1 Front Panel Pin Connections, Front View

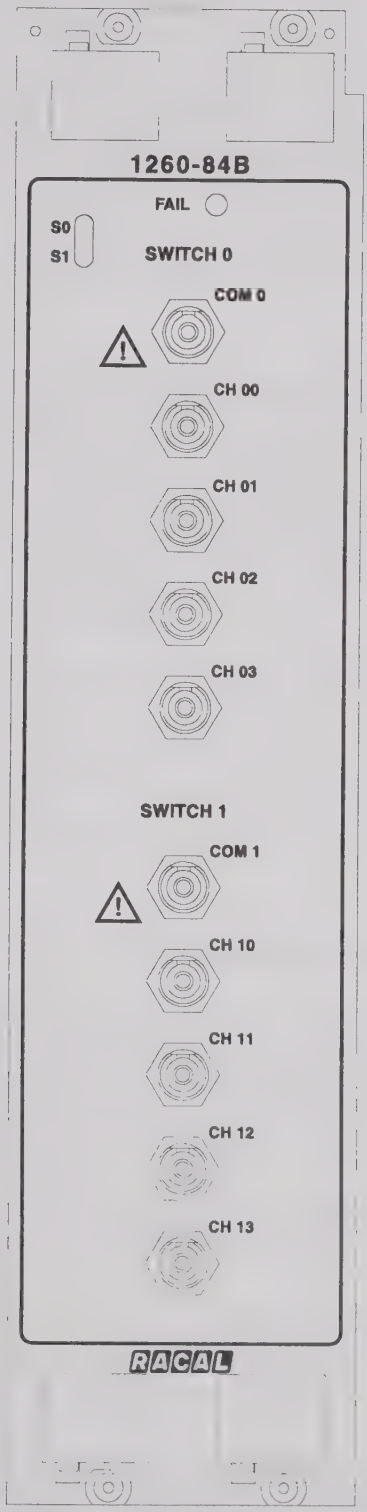


Figure 2-6 1260-84B-2 Front Panel Pin Connections, Front View

## Mating Connectors

Mating connectors for the 1260-84 module are standard FC types. It is preferable to use fiberoptic cables with low insertion loss, low reflection FC/UPC or FC/SPC connector types.

Refer to Appendix C for cleaning adapters, connectors, and handling of fiberoptic cables.

## Optical Ports

**WARNING:** To avoid eye damage, do not look directly into the optical output ports while there is an optical signal connected to the input port. Always attach the output ports to a receiver or cover the ports with the supplied caps before enabling the source signal to the input port.

# Chapter 3
# MODULE OPERATION

## General Information

The 1260-84 may be operated either in *message-based mode* or in *register-based mode*.

When the *message-based mode* of operation is used, commands are sent to the 1260-01T command module. The 1260-01T command module interprets the commands, and operates the 1260-84 module by sending 8-bit bytes to control registers on the 1260-84 module.

A conceptual view of the message-based mode of operation is shown in Figure 3-1 below.

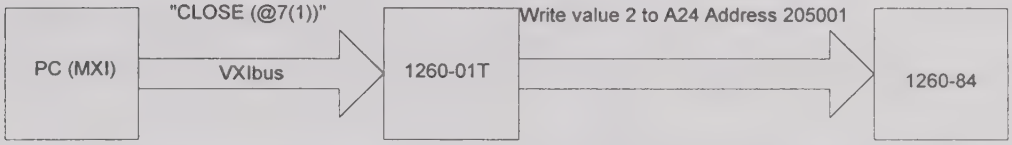


**Figure 3-1, Message-Based Mode of Operation**

When the *register-based mode* of operation is used, the user writes to the control registers on the 1260-84 module directly. The 1260-01T command module does not monitor the operations, and does not track the state of the optical switch on the module in this mode.

A conceptual view of the register-based mode of operation is shown in Figure 3-2 below.

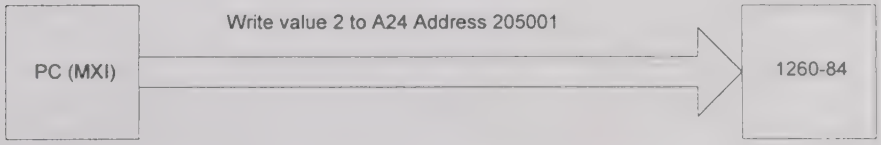


**Figure 3-2, Register-Based Mode of Operation**

Since the 1260-01T command module does not monitor the register-based mode of operation, it is advisable to select **either** the message-based or the register-based mode of operation, and continue to use the same mode throughout the application program.

In general, the message-based mode of operation is easier to use with utility programs, such as National Instruments VIC program. The message-based mode allows the user to send ASCII text commands to the 1260-01T and to read replies from the 1260-01T. In addition, there are a few features, such as a **SCAN** list and **OPC** commands, which are available only with the message-based mode of operation.

The register-based mode of operation provides a faster update of optical switches. This mode provides for switch operations in less than 4.5 microseconds (not counting software overhead inherent in I/O libraries such as VISA) and optical switch switching time. Since the optical switch switching time is slow, the Message Based operation is preferable.

Consult the 1260-01T User's Manual for a comparison of the message-based and register-based modes of operation.

# Operating The 1260-84 In Message-Based Mode

## Channel Descriptors For The 1260-84 Module

The standard 1260-01T commands are used to operate the 1260-84 module. These commands are described in the 1260-01T User's Manual.

Each 1260-01T command uses a *channel descriptor* to select the channel(s) of interest. The syntax for a channel descriptor is the same for all 1260 series modules. In general, the following syntax is used to select a single channel:

```
(@ <module address> (<channel descriptor>) )
```

Where:

<module address> is the address of the 1260-84 module, as set by the logical address DIP switch SW1 on the 1260-84.

The module address is a number from 1 through 12, inclusive.

Set the module addresses for the 1260-84 and other 1260-Series modules so that no address is used by more than one 1260-Series module. For instructions on setting module addresses for a 1260-Series module, see the label on the side panel of the module.

<channel descriptor> is the 1260-84 channel to operate. The <channel descriptor> Is comprised of a switch designator 0 or 1 and a channel designator 0 – 4 where 4 designates all channels open. If a switch designator is not specified the default is switch 0.

Multiple individual channels may be specified using the following channel descriptor syntax:

```
(@ <module address> ( <chan1> , <chan2> , .
. ., <chanN> ))
```

A range of channels may be specified using the following channel descriptor syntax:

```
(@ <module address> ( <first channel> :
<last channel> ))
```

The following examples illustrate the use of the channel descriptors for the 1260-84:

| | |
|---|---|
| `OPEN (@8(00))` | Open channel 0 of switch 0 on the 1260-84 with module address 8 |
| `CLOSE (@8(00,13))` | Close channels 0 of switch 0 and 3 of switch1 on the 1260-84 with module address 8. |
| `CLOSE (@2(04,14))` | Open all channels on both switches on the 1260-84 with module address 2 |

## Implicit Exclusion List

The firmware for the 1260-84 implements an "implicit exclusion list". This means that for any given Switch, **no more than one channel can be connected to the common channel at one time**. Thus if the user specifies the command:

```
CLOSE (@12(0:3))
```

Then, after the command has been executed, the only channel that will be connected is channel "3" of switch 0. Channels 0,1, and 2 will not have been closed, since the firmware enforces the "implicit exclusion list"

## Reply To The MOD:LIST? Command

The 1260-01T returns a reply to the MOD:LIST? command. This reply is unique for each different 1260 series switch module. The syntax for the reply is:

<module address> : <module-specific identification string>

The <module-specific identification string> for the 1260-84 is:

1260-84A SINGLE 1X4 OPTICAL SWITCH MODULE

or

1260-84B DUAL 1X4 OPTICAL SWITCH MODULE

So, for a 1260-84A whose <module address> is set to 8, the reply to this query would be:

8 : 1260-84A SINGLE 1X4 OPTICAL SWITCH MODULE

## Using The *OPC Query / Command

When you are using the 1260-84 in an automated test environment, it is important that you be aware of the time it takes for the switch movement to complete. For example, suppose you develop an automated test in which the optical switch closure is over the VXI bus via the CLOSE command. After each switch configuration, you might then take a reading from an optical power meter. In such a sequence, it is important that you not initiate the reading from the optical power meter before the 1260-84 has come to a stable position (that is, the BUSY indicator is no longer illuminated).

Below is an example that illustrates the use of instrument commands and queries utilizing the *OPC? query. In this

example, queries to other instruments (such as the power meter) are not made until all of the 1260-84's pending operations have completed.

**Example:** A command is sent to the 1260-84 to make a connection to channel 07, the command is immediately followed by an *OPC? query to the same 1260-84.

1. Write to the 1260-84 VXI address:

```
CLOSE(@8(03)); *OPC?
```

2. Read from 1260-84 the VXI address:

```
1
```

Depending on the previous switch setting of the 1260-84, several hundred milliseconds may be required before the `CLOSE(@8(03))` command is completed and the *OPC? produces a "1" in the 1260-01T output queue. After the *OPC? query is sent to the1260-84, the programmer should immediately attempt a read instruction from the controller. The programmer's controller will wait until the 1260-84 finishes all adjustments and the *OPC query provides a "1" to be read.

***NOTE:***

**It is important that you remember to set the time-out of the controller's READ instruction to be greater than the longest time possible for the 1260-84 to make any channel changes (up to 500msecs may be required to make large changes to the optical switch.**

You can also have the OPC bit of the SESR set by using the command form of *OPC instead of the query form. By setting the OPC bit to "1" via an *OPC command, an event will be generated assuming the user has enabled the proper register bits.

- Advanced programmers can develop other methods to accomplish the set-and-wait-until-complete routine utilizing the event queues and status registers provided in the 1260-01T controller. Refer to the 1260 Option 01T Users Manual Publication No. 980806-999.

## Operating The 1260-84 in Register-Based Mode

The 1260-84 may be operated by directly setting one of the three control registers on the 1260-84 module. The first control register on the module sets the channel for switch 0. The second control register sets the channel for switch 1. The third control register controls the channel update for both switches.

The control registers are located in the VXIbus A24 Address Space. The actual A24 address for a control register depends on:

1. The A24 Address Offset assigned to the 1260-01T module by the Resource Manager program. The Resource Manager program is provided by the VXIbus slot-0 controller vendor. The A24 Address Offset is placed into the "Offset Register" of the 1260-01T by the Resource Manager.

2. The <module address> of the 1260-84 module. This is set by the setting of the logical Address DIP switch SW1on the 1260-84 to a value between 1 and 12 inclusive .

3. The control register on the 1260-84 to update. Each control register on the 1260-84 has a unique address.

The base A24 Address for the 1260-84 module may be calculated by:

(A24 Offset of the 1260-01T) + (1024 x Module Address of 1260-84).

The A24 Offset is usually expressed in hexadecimal. A typical value of $204000_{16}$ will be used in the examples which follow. So, a sample 1260-84 with a module address of 7 would have the base A24 Address computed as follows:

Base A24 Address of 1260-84 = $204000_{16} + (400_{16} \times 7_{10}) = 205C00_{16}$

The control registers for 1260 series modules are always on odd A24 addresses. The three control registers for the 1260-84 reside at the following three odd A24 addresses for the module:

(Base A24 Address of 1260-84) + 1 = Switch Data Register 0

(Base A24 Address of 1260-84) + 3 = Switch Data Register 1

(Base A24 Address of 1260-84) + F = Switch Strobe/Status Register F

So, for our example, the three control registers are located at:

| | |
|---|---|
| 205C01 | Switch Data Register 0, controls Optical Switch 0 |
| 205C03 | Switch Data Register 1, controls Optical Switch 1 |
| 205C0F | Switch Strobe/Status Register, controls both Optical Switches 0 & 1. |

## Switch Data Write Register

When a channel is closed, the two front-panel connectors associated with that channel are optically connected. When a channel is opened, the optical connection is broken and the two front panel connectors are optically isolated.

The Optical Switch is controlled in an eight-bit wide bank (since the firmware outputs an entire eight-bit byte at a time over the local bus to the channel module). The Switch is controlled via the firmware by the encoded data that is written to the corresponding Switch Data Register. Refer to the address map in Appendix B for specific addresses and data bits. Subsequent to writing to the Data Registers, firmware must toggle the switch strobe bit in order to store the data in the switch data registers into the switch. This will be explained in the following paragraphs.

The Switch Data Register data bits for Switch 0 channels are shown below and also in Appendix A.

| Switch Data Register 0 Bits | Channel Descriptor | Connector Channel | Connector Channel |
|---|---|---|---|
| $00_{16}$- $7f_{16}$ | 04 | COM 0 | No Connection |
| $80_{16}$ | 00 | COM 0 | 00 |
| $81_{16}$ | 01 | COM 0 | 01 |
| $82_{16}$ | 02 | COM 0 | 02 |
| $83_{16}$ | 03 | COM 0 | 03 |

## Switch Data Status Read Register

The 1260-84, via the Data Status Register provides a read back of the data that is stored in the corresponding Switch Data Register. This can be used as verification of the status of the switch data bits. Refer to the address map in Appendix B for specific addresses.

## Optical Switch Strobe Write Register

As mentioned before, the data that resides in the Switch Data Register needs to be "Strobed" into the Optical Switch. The D0 and D1 bits in this register must be toggled. (set to a 1, set to a 0, set to a 1) in order to strobe the data from the data register into the optical switch. This happens after data is written to the switch data register. Refer to the address map in Appendix B for specific addresses and data bits.

## Optical Switch Status Read Register

In addition to the status of the data bits, the 1260-84 provides a status of the optical switch as well as the status of the Strobe Register Strobe Bits. The optical switch provides a Busy/Ready-status bit as well as an Error bit that can be queried by the software. Refer to the address map in Appendix B for specific addresses and data bits.

**Busy/Ready- Status**

The Busy/Ready- Status bit will be a logic 1 when the optical switch is busy (during the switching time) and a logic 0 when the switch is ready (in a stable channel position) This bit will stay at a logic 1 until the switch is ready to receive a new position command. If the software commands the switch to move to it's existing position (no data change) this bit will go to a logic 1 for 60-80 msecs.

The register based application software will have to query this bit in order to synchronize the switch closure with the application software. The application software may require the Busy bit to be polled in order to determine when the optical switch is closed.

**Error Status**

The Error Status bit will be a logic 1 when a stepper motor or the reset (channel 4) proximity switch error occurs. An error status also occurs if the switch module is commanded to go to a position other than channels 0 through 4 ($84_{16}$ to $FF_{16}$).

This bit should be read at the same time the Busy/Ready- Status bit is read. If an error occurs, the software can attempt to clear the error by resetting the switch (to $00_{16}$) followed by a second attempt to set the channel. If an error occurs again the application software should respond with an error message indicating a switch failure.

**Strobe Status**

The Strobe Status bit provides a read back of the present state of the Strobe bit in the Optical Switch Strobe Register.

## 1260-84 Example Code

The VISA I/O library may be used to control the module. The VISA function viOut8() is used to write a single 8-bit byte to a control register, while viIn8() is used to read a single 8-bit byte from the control register. The following code example shows th use of viOut8() to update the 1260-84 module.

The VISA library functions (viIn8() and viOut8()) account for the base A24 offset of the 1260-01T controller. Therefore, the application code below uses only the module address to calculate the offset of the two control registers and the status register.

The following example shows many places where "error handling code goes here". This is intended for application-specific error handling code which depends on the application and the manner in which errors are handled. Therefore, the specifics of the error handling code are not shown in the example.

```
#include <visa.h>

/* This example shows a 1260-01T at logical address 16 and a VXI/MXI*
/* interface */
#define RI1260_01_DESC    "VXI::16"

/* For a GPIB-VXI interface, and a logical address of 77 */
/* the descriptor would be:  "GPIB-VXI::77" */

/* this example shows a 1260-84B with module address 7 */
#define MOD_ADDR_84  7

/* bit patterns to control strobes and to read status */
#define STROBE0_MASK 0x01
#define STROBE1_MASK 0x02
#define BUSY0_MASK   0x10
#define ERR0_MASK          0x20
#define BUSY1_MASK   0x40
#define ERR1_MASK          0x80

void example_operate_1260_84(void)
{
ViInt32 base_addr;
ViBusAddress mux0_creg;
ViBusAddress mux1_creg;
ViBusAddress statctl_reg;
ViSession hdl1260;   /* VISA handle to the 1260-01T */
ViSession hdlRM;           /* VISA handle to the resource manager */
ViStatus error;      /* VISA error code */
ViUInt8 reg_val;           /* register value read back */
ViUInt8 ctrl_val;          /* control register value */
int is_busy;         /* flag for testing busy status */


      /* open the resource manager */
      /* this must be done once in application program */
      error = viOpenDefaultRM (&hdlRM);
      if (error < 0) {
          /* error handling code goes here */
      }

      /* get a handle for the 1260-01T */
      error = viOpen (hdlRM, RI1260_01_DESC, VI_NULL,VI_NULL,&hdl1260);
      if (error < 0) {
          /* error handling code goes here */
      }
```

```
/* form the offset for control register 0 */
/* note that the base A24 Address for the 1260-01T */
/* is already accounted for by VISA calls viIn8() and viOut8() */

     /* module address shifted 10 places = module address x 1024 */
     base_addr = (MOD_ADDR_84 << 10);
     mux0_creg = (ViBusAddress) (base_addr + 1);
     mux1_creg = (ViBusAddress) (base_addr + 3);
     statctl_reg = (ViBusAddress) (base_addr + 0xF);


    /*
     * CLOSE CHANNEL 3 OF MUX 0
      */

    /* first set up data register for MUX 0 to select channel 3 */
     error = viOut8 (hdl1260, VI_A24_SPACE, mux0_creg, 0x83);
     if (error < 0) {
         /* error handling code goes here */
     }

    /* now strobe MUX 0 (set bit high-low-high) */
     ctrl_val = STROBE0_MASK | STROBE1_MASK;
     error = viOut8 (hdl1260, VI_A24_SPACE, statctl_reg, ctrl_val);
     if (error < 0) {
         /* error handling code goes here */
     }

    ctrl_val = STROBE1_MASK;
     error = viOut8 (hdl1260, VI_A24_SPACE, statctl_reg, ctrl_val);
     if (error < 0) {
         /* error handling code goes here */
     }

    ctrl_val = STROBE0_MASK | STROBE1_MASK;
     error = viOut8 (hdl1260, VI_A24_SPACE, statctl_reg, ctrl_val);
     if (error < 0) {
         /* error handling code goes here */
     }

    /* read the status register, wait until BUSY is low */
     is_busy = 1;
     while (is_busy) {

         /* read status register */
         error = viIn8( hdl1260, VI_A24_SPACE, statctl_reg,
```

```
                    &reg_val);
     if (error < 0) {
          /* error handling code goes here */
     }

     /* check for error */
     if (reg_val & ERR0_MASK)
          {
          /* error has occurred, reset MUX 0 */
          viOut8( hdl1260, VI_A24_SPACE, mux0_creg, 0x00 );
          ctrl_val = STROBE0_MASK | STROBE1_MASK;
          viOut8(hdl1260, VI_A24_SPACE, statctl_reg, ctrl_val);
          ctrl_val = STROBE1_MASK;
          viOut8(hdl1260, VI_A24_SPACE, statctl_reg, ctrl_val);
          ctrl_val = STROBE0_MASK | STROBE1_MASK;
          viOut8(hdl1260, VI_A24_SPACE, statctl_reg, ctrl_val);

          /* rest of error handling code goes here */
          }

     /* check if still busy (moving) */
     if ( ! (reg_val & BUSY0_MASK) )
          is_busy = 0;

} /* end of while loop */

/*
 * CLOSE CHANNEL 2 of MUX 1
  */

/* first set up data register for MUX 1 to select channel 2 */
 error = viOut8 (hdl1260, VI_A24_SPACE, mux1_creg, 0x82);
 if (error < 0) {
     /* error handling code goes here */
 }

/* now strobe MUX 1 (set bit high-low-high) */
 ctrl_val = STROBE0_MASK | STROBE1_MASK;
 error = viOut8 (hdl1260, VI_A24_SPACE, statctl_reg, ctrl_val);
 if (error < 0) {
     /* error handling code goes here */
 }

ctrl_val = STROBE0_MASK;
 error = viOut8 (hdl1260, VI_A24_SPACE, statctl_reg, ctrl_val);
 if (error < 0) {
     /* error handling code goes here */
```

```
    }

    ctrl_val = STROBE0_MASK | STROBE1_MASK;
    error = viOut8 (hdl1260, VI_A24_SPACE, statctl_reg, ctrl_val);
    if (error < 0) {
        /* error handling code goes here */
    }

    /* read the status register, wait until BUSY is low */
    is_busy = 1;
    while (is_busy) {

        /* read status register */
        error = viIn8( hdl1260, VI_A24_SPACE, statctl_reg,
                       &reg_val);
        if (error < 0) {
            /* error handling code goes here */
        }

        /* check for error */
        if (reg_val & ERR1_MASK)
            {
            /* error has occurred, reset MUX 1 */
            viOut8( hdl1260, VI_A24_SPACE, mux1_creg, 0x00 );
            ctrl_val = STROBE0_MASK | STROBE1_MASK;
            viOut8(hdl1260, VI_A24_SPACE, statctl_reg, ctrl_val);
            ctrl_val = STROBE0_MASK;
            viOut8(hdl1260, VI_A24_SPACE, statctl_reg, ctrl_val);
            ctrl_val = STROBE0_MASK | STROBE1_MASK;
            viOut8(hdl1260, VI_A24_SPACE, statctl_reg, ctrl_val);

            /* rest of error handling code goes here */
            }

        /* check if still busy (moving) */
        if ( ! (reg_val & BUSY1_MASK) )
            is_busy = 0;

    } /* end of while loop */

    /* close the VISA session */
    error = viClose( hdl1260 );
    if (error < 0) {
        /* error handling code goes here */
    }
}
```

## Power and Module Cooling Considerations

The 1260-84 is a VXI module providing precise switching of optical channels using defraction limited collimating lenses which enhance both thermal stability and repeatability. Because of this, certain precautions should be applied when using the switch module in a VXI chassis.

## Airflow Requirements

VXI Modules are required to specify a particular airflow to maintain a specific temperature rise. The air flow required and the resultant back pressure (pressure drop across the module) values determine a specific operating point that is plotted or compared against a VXI chassis cooling curve. If the module operating point is below the chassis cooling curve, there is a high probability that the module will remain within its specified temperature rise. If the operating point lies above the chassis cooling curve the temperature rise may exceed the specified value.

The following procedure details how to calculate the cooling requirements for the 1260-84B-1.

1. Determine the maximum temperature rise allowed across the module. This is typically 10 °C, but could be higher or lower depending the chassis ambient temperature, and the overall reliability requirements of the module.

2. Determine the required airflow to maintain the specified temperature rise of the module. This is calculated from the module power and the desired temperature rise, and the specific heat of air. For a given temperature rise the required air flow is:

   Airflow(liters/sec) = 0.83/Temp Rise(°C) x Module Power (Watts)

   For a 10 °C rise and a 1260-84B-1 module power of 12 Watts:

   Airflow(liters/sec) = 0.83/10 °C x 12 Watts = 1.0 liters /sec

3. Determine the pressure drop across the module when the required airflow ( liters/sec) is forced through the module. This can be determined by looking at pressure drop vs. airflow plot for the 1260-84B-1 Module in **Figure 3-4**. Find the required airflow and then read the corresponding pressure in mm $H_2O$. For the case above, with an airflow of 1.0 liters/sec the

pressure drop read from **Figure 3-4** is 0.12 mm $H_2O$.

4. Plot the 1260-84B-1 operating point (Pressure, Airflow) against the chassis cooling curve. If the module operating point lies under the chassis curve, the module should remain within the specified temperature. An example of a 1260-84B-1 Module in a Racal 1261B VXI Chassis is shown in **Figure 3-4.** The chassis airflow plotted is for the "worst case" slot airflow. In the 1261B chassis, the 1260-84B-1 could be placed in any slot without much concern for the temperature rise of 10 °C being exceeded.

***CAUTION***

**The required airflow may need to be increased depending on airflow distribution across the module, the ambient temperature and reliability issues. Consult the VXI specification for more details.**

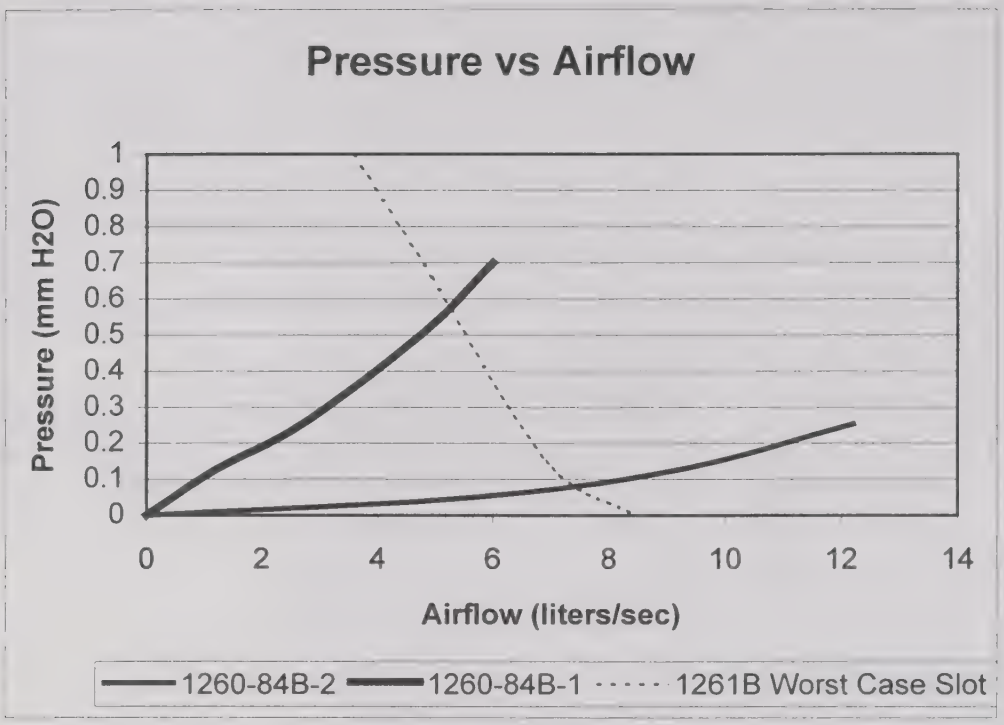


**Figure 3-4, 1260-84 Optical Switch and Racal Instruments 1261B Chassis Airflow Resistance Curves**

# Chapter 4
# DRAWINGS


| | | |
|---|---|---|
| 407678 | Final Assy, 1260-84A-2 | 4-3 |
| 407678-001 | Final Assy, 1260-84B -2 | 4-5 |
| 407692-001 | Final Assy, 1260-84A-1 | 4-7 |
| 407692-002 | Final Assy, 1260-84B-1 | 4-9 |
| 405148 | PCB Assy, L-BUS Jumper | 4-11 |
| 435148 | Schematic, L-BUS Jumper | 4-12 |
| 405154 | PCB Assy, 1260-84/88 | 4-13 |
| 435154 | Schematic, 1260-84/88 | 4-14 |
| 407691 | Cable Assy, Interface | 4-25 |

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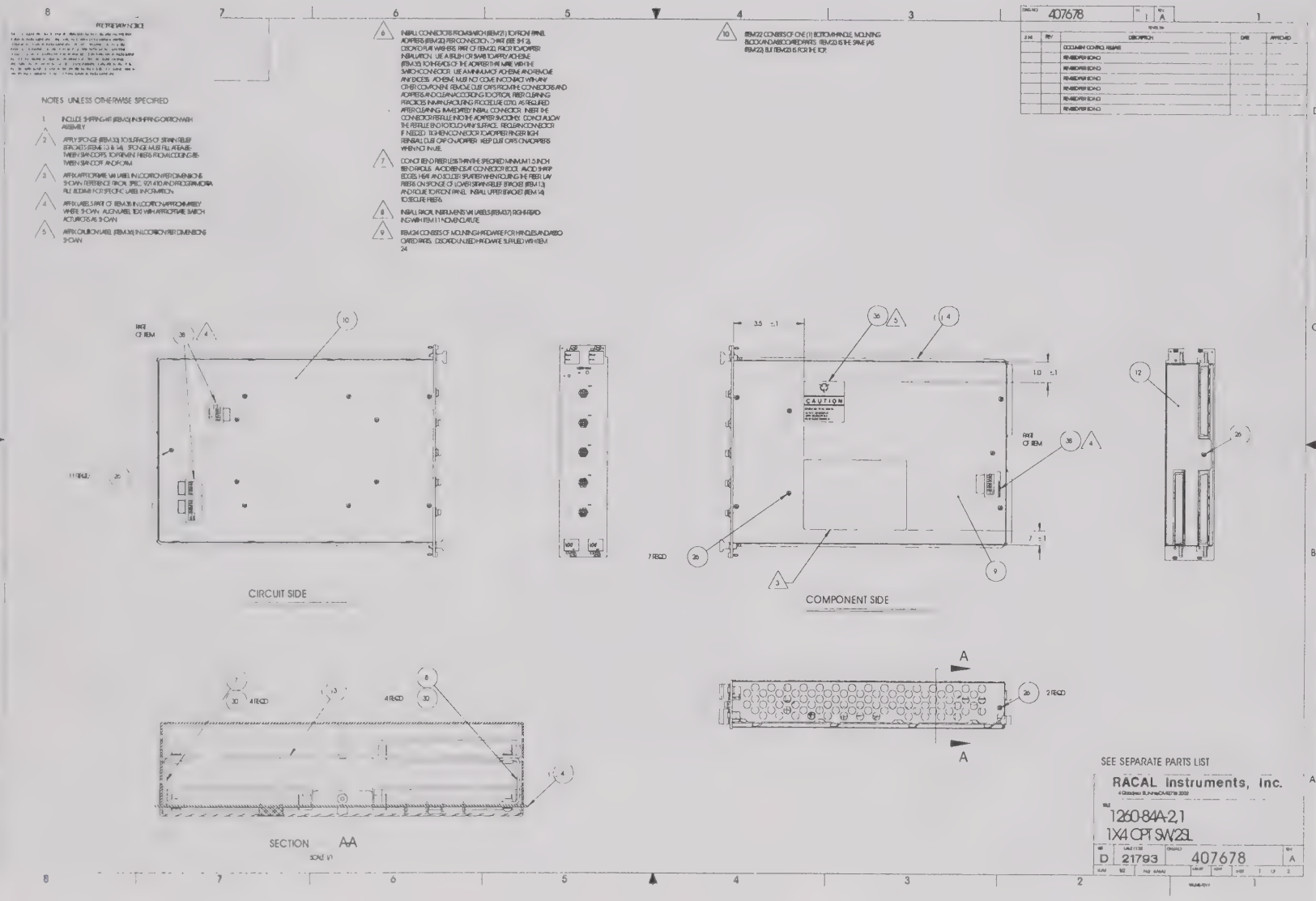
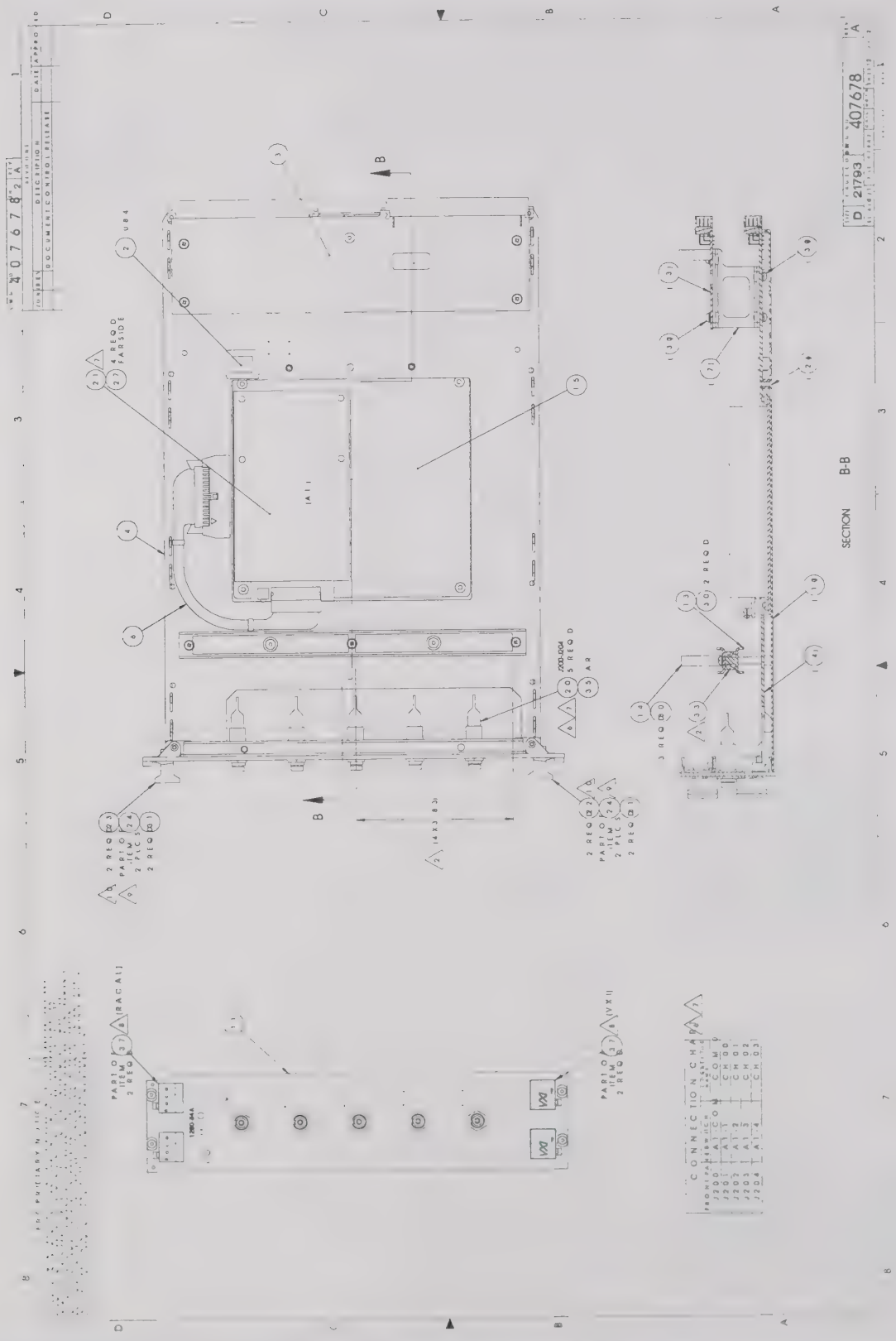
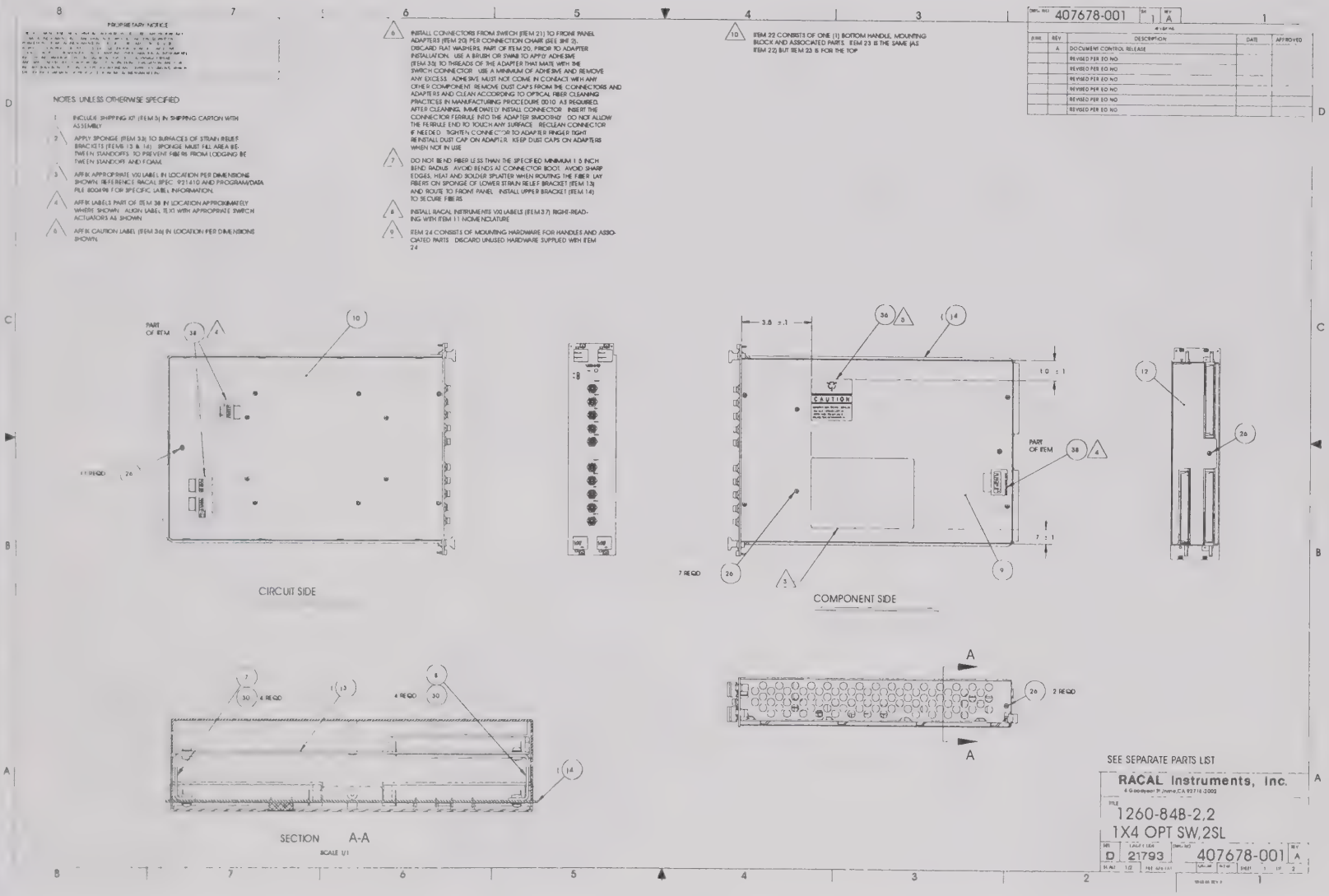
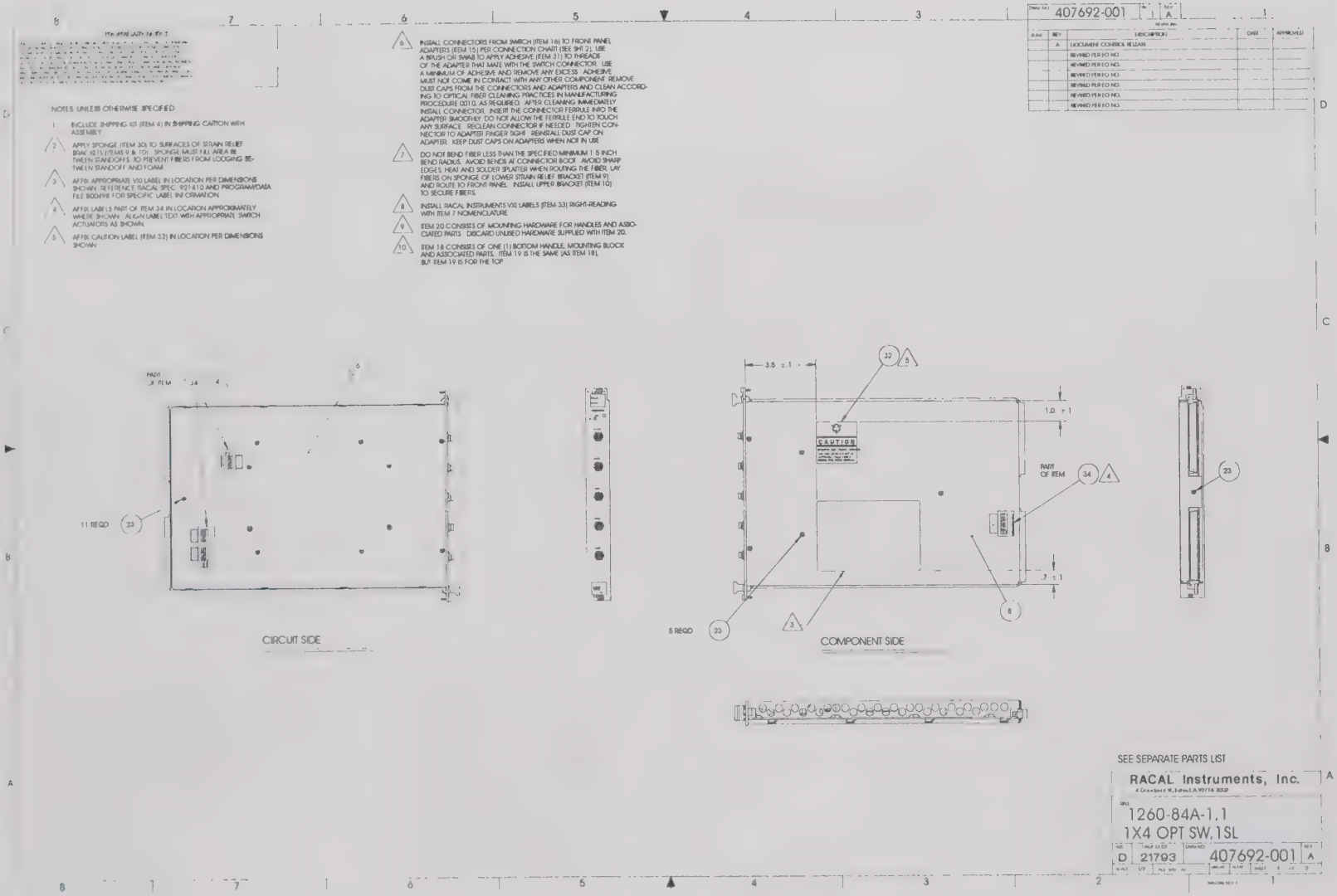
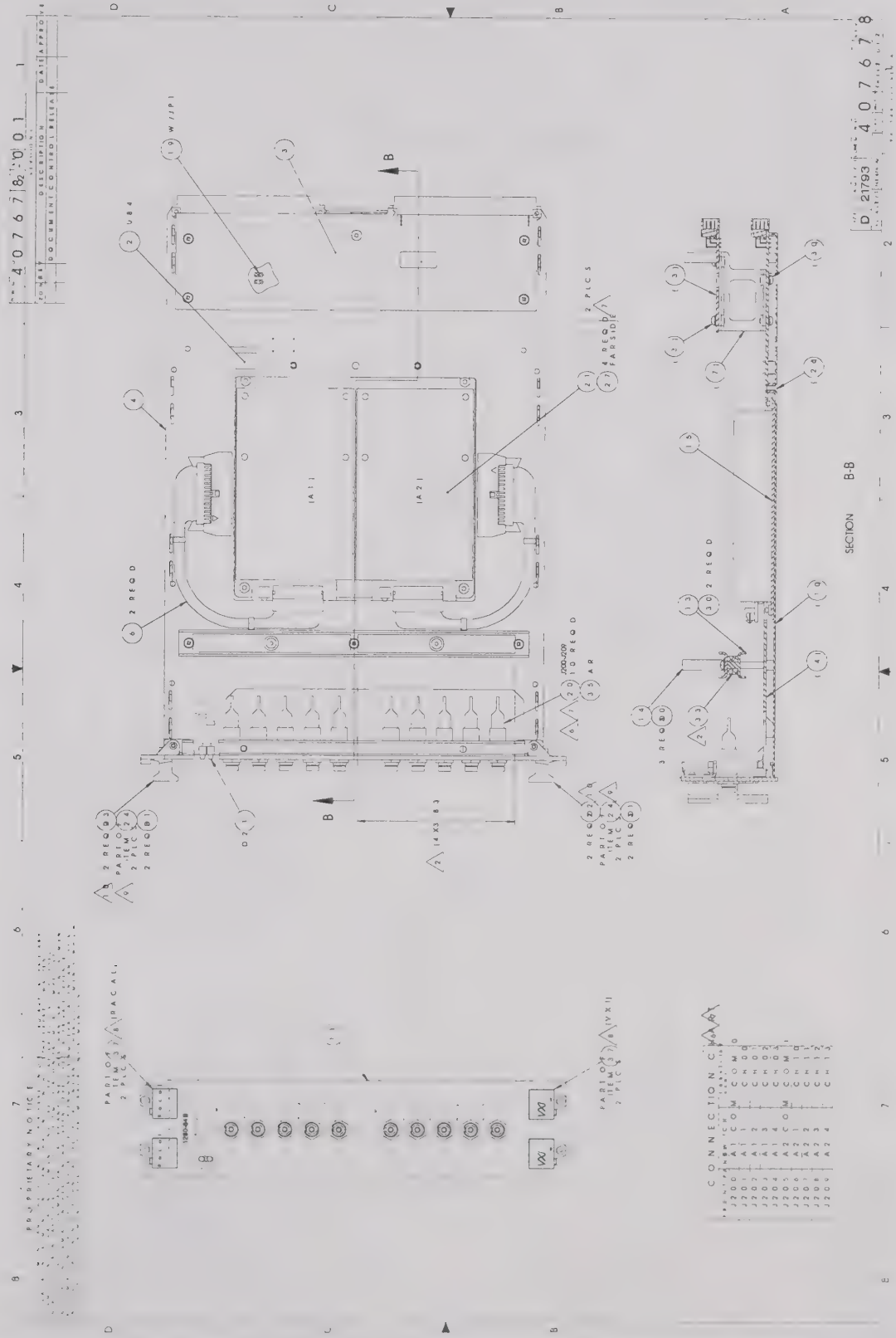
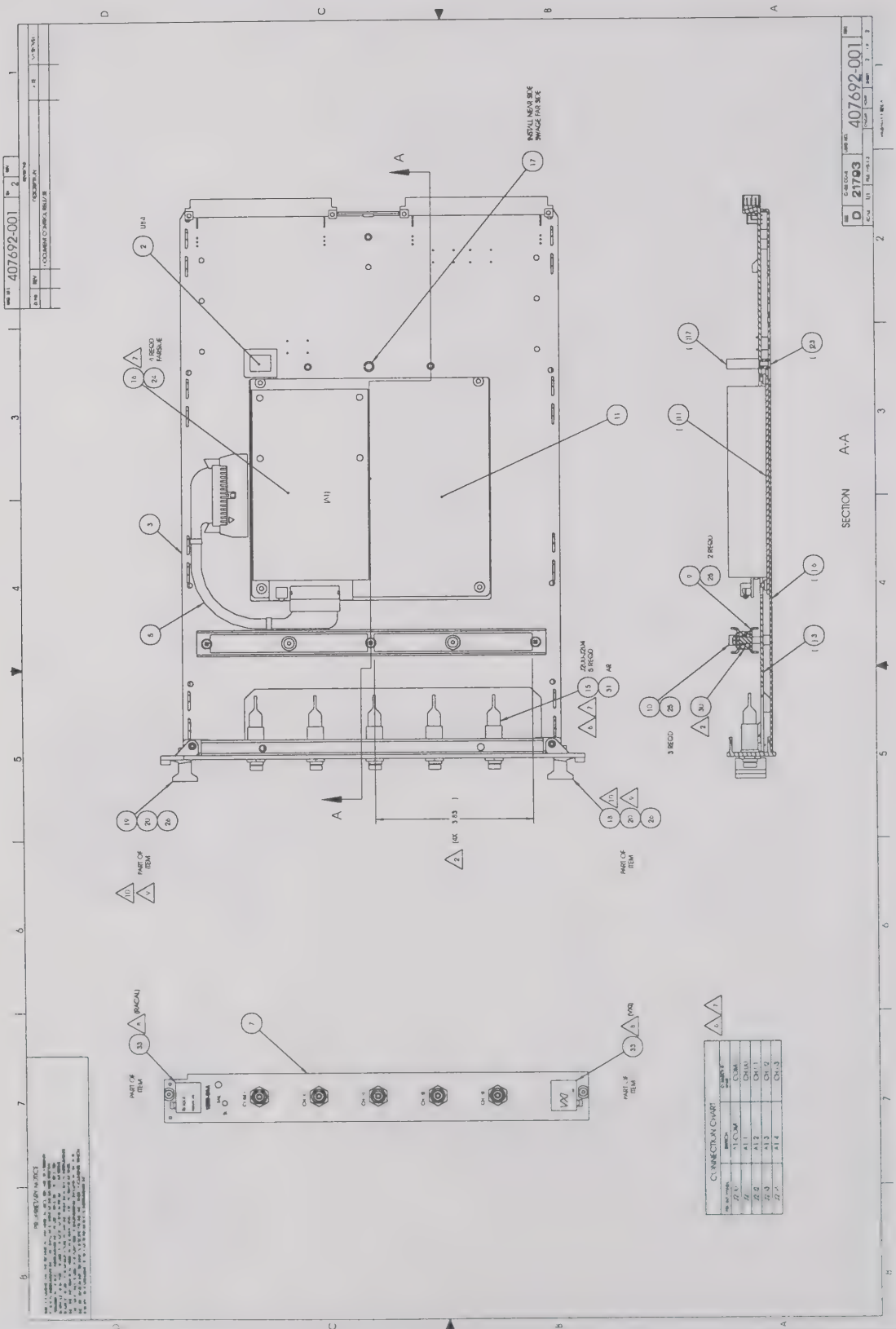

407678
NOTES UNLESS OTHERWISE SPECIFIED
CIRCUIT SIDE
COMPONENT SIDE
SECTION AA
SEE SEPARATE PARTS LIST
RACAL Instruments, Inc.
1260-84A-2,1
1X4 OPT SW/29L
407678




PROPRIETARY NOTICE
NOTES: UNLESS OTHERWISE SPECIFIED
1 INCLUDE SHIPPING KIT (ITEM 5) IN SHIPPING CARTON WITH ASSEMBLY
2 APPLY SPONGE (ITEM 33) TO SURFACES OF STRAIN RELIEF BRACKETS (ITEMS 13 & 14) SPONGE MUST FILL AREA BETWEEN STANDOFFS TO PREVENT FIBERS FROM LODGING BETWEEN STANDOFF AND FOAM.
3 AFFIX APPROPRIATE VOI LABEL IN LOCATION PER DIMENSIONS SHOWN. REFERENCE RACAL SPEC. 921410 AND PROGRAM/DATA FILE 800496 FOR SPECIFIC LABEL INFORMATION.
4 AFFIX LABELS PART OF ITEM 38 IN LOCATION APPROXIMATELY WHERE SHOWN. ALIGN LABEL FLAT WITH APPROPRIATE SWITCH ACTUATORS AS SHOWN.
5 AFFIX CAUTION LABEL (ITEM 36) IN LOCATION PER DIMENSIONS SHOWN.
6 INSTALL CONNECTORS FROM SWITCH (ITEM 21) TO FRONT PANEL ADAPTERS (ITEM 20) PER CONNECTION CHART (SEE SHT 2). DISCARD FLAT WASHERS, PART OF ITEM 20, PRIOR TO ADAPTER INSTALLATION. USE A BRUSH OR SWAB TO APPLY ADHESIVE (ITEM 35) TO THREADS OF THE ADAPTER THAT MATE WITH THE SWITCH CONNECTOR. USE A MINIMUM OF ADHESIVE AND REMOVE ANY EXCESS. ADHESIVE MUST NOT COME IN CONTACT WITH ANY OTHER COMPONENT. REMOVE DUST CAPS FROM THE CONNECTORS AND ADAPTERS AND CLEAN ACCORDING TO OPTICAL FIBER CLEANING PRACTICES IN MANUFACTURING PROCEDURE 0010. AS REQUIRED, AFTER CLEANING, IMMEDIATELY INSTALL CONNECTOR. INSERT THE CONNECTOR FERRULE INTO THE ADAPTER SMOOTHLY. DO NOT ALLOW THE FERRULE END TO TOUCH ANY SURFACE. RECLEAN CONNECTOR IF NEEDED. TIGHTEN CONNECTOR TO ADAPTER FINGER TIGHT. REINSTALL DUST CAP ON ADAPTER. KEEP DUST CAPS ON ADAPTERS WHEN NOT IN USE.
7 DO NOT BEND FIBER LESS THAN THE SPECIFIED MINIMUM 1.5 INCH BEND RADIUS. AVOID BENDS AT CONNECTOR BOOT. AVOID SHARP EDGES, HEAT AND SOLDER SPLATTER WHEN ROUTING THE FIBER. LAY FIBERS ON SPONGE OF LOWER STRAIN RELIEF BRACKET (ITEM 13) AND ROUTE TO FRONT PANEL. INSTALL UPPER BRACKET (ITEM 14) TO SECURE FIBERS.
8 INSTALL RACAL INSTRUMENTS VOI LABELS (ITEM 37) RIGHT-READING WITH ITEM 11 NOMENCLATURE.
9 ITEM 24 CONSISTS OF MOUNTING HARDWARE FOR HANDLES AND ASSOCIATED PARTS. DISCARD UNUSED HARDWARE SUPPLIED WITH ITEM 24.
10 ITEM 22 CONSISTS OF ONE (1) BOTTOM HANDLE, MOUNTING BLOCK AND ASSOCIATED PARTS. ITEM 23 IS THE SAME (AS ITEM 22) BUT ITEM 23 IS FOR THE TOP.
DWG. NO. 407678-001 SH 1 REV A
REV | DESCRIPTION | DATE | APPROVED
A DOCUMENT CONTROL RELEASE
REVISED PER EO NO
CIRCUIT SIDE
COMPONENT SIDE
SECTION A-A
SCALE 1/1
SEE SEPARATE PARTS LIST
RACAL Instruments, Inc.
1260-84B-2,2
1X4 OPT SW,2SL
D 21793 407678-001 A


407692-001
NOTES: UNLESS OTHERWISE SPECIFIED
1 INCLUDE SHIPPING KIT (ITEM 4) IN SHIPPING CARTON WITH ASSEMBLY.
2 APPLY SPONGE (ITEM 30) TO SURFACES OF STRAIN RELIEF BRACKETS (ITEMS 9 & 10). SPONGE MUST FULL AREA BETWEEN STANDOFFS, TO PREVENT FIBERS FROM LODGING BETWEEN STANDOFFS AND FOAM.
3 AFFIX APPROPRIATE V30 LABEL IN LOCATION PER DIMENSIONS SHOWN. (REFERENCE RACAL SPEC. 921410 AND PROGRAM/DATA FILE BOOKFIX FOR SPECIFIC LABEL INFORMATION.
4 AFFIX LABELS PART OF ITEM 34 IN LOCATION APPROXIMATELY WHERE SHOWN. ALIGN LABEL TEXT WITH APPROPRIATE SWITCH ACTUATORS AS SHOWN.
5 AFFIX CAUTION LABEL (ITEM 32) IN LOCATION PER DIMENSIONS SHOWN.
6 INSTALL CONNECTORS FROM SWITCH (ITEM 16) TO FRONT PANEL ADAPTERS (ITEM 15) PER CONNECTION CHART (SEE SHT 2). USE A BRUSH OR SWAB TO APPLY ADHESIVE (ITEM 31) TO THREADS OF THE ADAPTER THAT MATE WITH THE SWITCH CONNECTOR. USE A MINIMUM OF ADHESIVE AND REMOVE ANY EXCESS. ADHESIVE MUST NOT COME IN CONTACT WITH ANY OTHER COMPONENT. REMOVE DUST CAPS FROM THE CONNECTORS AND ADAPTERS AND CLEAN ACCORDING TO OPTICAL FIBER CLEANING PRACTICES IN MANUFACTURING PROCEDURE 001Q, AS REQUIRED. AFTER CLEANING IMMEDIATELY INSTALL CONNECTOR. INSERT THE CONNECTOR FERRULE INTO THE ADAPTER SMOOTHLY. DO NOT ALLOW THE FERRULE END TO TOUCH ANY SURFACE. RECLEAN CONNECTOR IF NEEDED. TIGHTEN CONNECTOR TO ADAPTER FINGER TIGHT. REINSTALL DUST CAP ON ADAPTER. KEEP DUST CAPS ON ADAPTERS WHEN NOT IN USE.
7 DO NOT BEND FIBER LESS THAN THE SPECIFIED MINIMUM 1.5 INCH BEND RADIUS. AVOID BENDS AT CONNECTOR BOOT. AVOID SHARP EDGES. HEAT AND SOLDER SPLATTER WHEN ROUTING THE FIBER. LAY FIBERS ON SPONGE OF LOWER STRAIN RELIEF BRACKET (ITEM 9) AND ROUTE TO FRONT PANEL. INSTALL UPPER BRACKET (ITEM 10) TO SECURE FIBERS.
8 INSTALL RACAL INSTRUMENTS V30 LABELS (ITEM 33) RIGHT-READING WITH ITEM 7 NOMENCLATURE.
9 ITEM 20 CONSISTS OF MOUNTING HARDWARE FOR HANDLES AND ASSOCIATED PARTS. DISCARD UNUSED HARDWARE SUPPLIED WITH ITEM 20.
10 ITEM 18 CONSISTS OF ONE (1) BOTTOM HANDLE, MOUNTING BLOCK AND ASSOCIATED PARTS. ITEM 19 IS THE SAME (AS ITEM 18), BUT ITEM 19 IS FOR THE TOP.
REVISIONS
DESCRIPTION
DOCUMENT CONTROL RELEASE
REVISED PER ECO NO.
CAGE
APPROVED
PART OF ITEM 34 4
11 REQD 23
CIRCUIT SIDE
3.5 ±.1
1.0 ±.1
.7 ±.1
CAUTION
32 5
PART OF ITEM 34 4
23
6 REQD 23
3
8
COMPONENT SIDE
SEE SEPARATE PARTS LIST
RACAL Instruments, Inc.
1260-84A-1,1
1X4 OPT SW,1SL
SIZE D
CAGE CODE 21793
DWG NO 407692-001
REV A
SCALE NONE
WEIGHT
SHEET 1 OF 2




407692-001
D 21793
407692-001
SECTION A-A
INSTALL HEATSINK BEFORE BRIDGE RECTIFIER
CONNECTION CHART

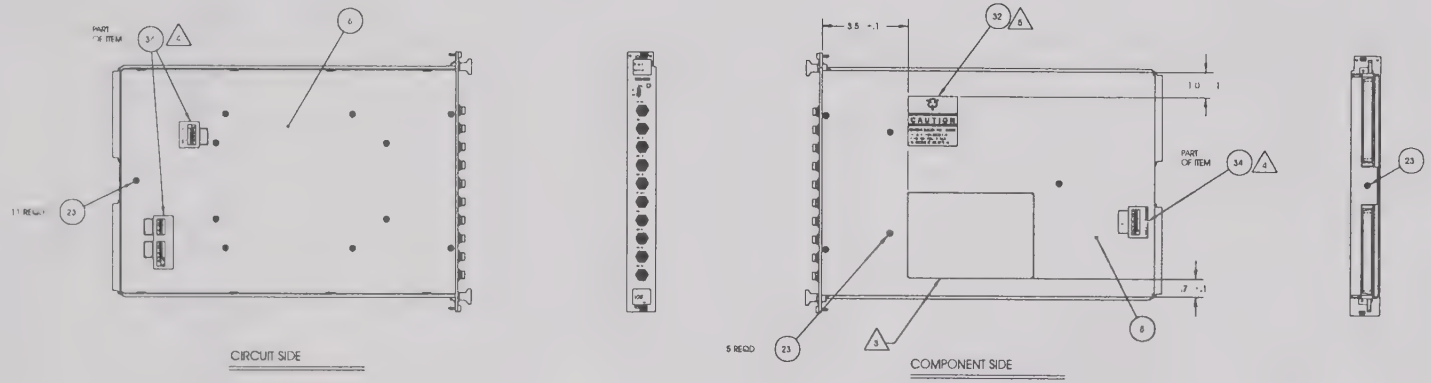
PROPRIETARY NOTICE

NOTES: UNLESS OTHERWISE SPECIFIED

1. INCLUDE SHIPPING KIT (ITEM 4) IN SHIPPING CARTON WITH ASSEMBLY.
2. APPLY SPONGE (ITEM 3.3) TO SURFACES. USE STRAIN RELIEF BRACKETS (ITEMS 9 & 17). SPONGE MUST FILL AREA BETWEEN STRAIN RELIEFS TO PREVENT FIBERS FROM LOOPING BETWEEN STRAIN RELIEF AND PC BOARD.
3. AFFIX APPROPRIATE VXI LABEL IN LOCATION PER DIMENSIONS SHOWN. REFERENCE RACAL SPEC. 9211410 AND PROGRAM/DATA FILE NUMBER FOR SPECIFIC LABEL INFORMATION.
4. AFFIX LABELS (PART OF ITEM 34) IN LOCATION APPROXIMATELY WHERE SHOWN. ALIGN LABEL TEXT WITH APPROPRIATE SWITCH ACTUATORS AS SHOWN.
5. AFFIX CAUTION LABEL (ITEM 32) IN LOCATION PER DIMENSIONS SHOWN.
6. INSTALL CONNECTORS FROM SWITCH (ITEM 16) TO FRONT PANEL ADAPTERS (ITEM 18) PER CONNECTION CHART (SEE SHT 2). USE A BRUSH OR SWAB TO APPLY ADHESIVE (ITEM 31) TO THREADS OF THE ADAPTER THAT MATE WITH THE SWITCH CONNECTOR. USE A MINIMUM OF ADHESIVE AND REMOVE ANY EXCESS. ADHESIVE MUST NOT COME IN CONTACT WITH ANY OTHER COMPONENT. REMOVE DUST CAPS FROM THE CONNECTORS AND ADAPTERS AND CLEAN ACCORDING TO OPTICAL FIBER CLEANING PRACTICES IN MANUFACTURING PROCEDURE 00110 AS REQUIRED. AFTER CLEANING IMMEDIATELY INSTALL CONNECTOR. INSERT THE CONNECTOR FERRULE INTO THE ADAPTER SMOOTHLY. DO NOT ALLOW THE FERRULE END TO TOUCH ANY SURFACE. RECLEAN CONNECTOR IF NEEDED. TIGHTEN CONNECTOR TO ADAPTER FINGER TIGHT. REINSTALL DUST CAP ON ADAPTER. KEEP DUST CAPS ON ADAPTERS WHEN NOT IN USE.
7. DO NOT BEND FIBER LESS THAN THE SPECIFIED MINIMUM 1.5 INCH BEND RADIUS. AVOID BENDS AT CONNECTOR BOOT. AVOID SHARP EDGES. HEAT AND SOLDER SPLATTER WHEN ROUTING THE FIBER. LAY FIBERS ON SPONGE OF LOWER STRAIN RELIEF BRACKET (ITEM 9) AND ROUTE TO FRONT PANEL. INSTALL UPPER BRACKET (ITEM 10) TO SECURE FIBERS.
8. INSTALL RACAL INSTRUMENTS VXI LABELS (ITEM 33) RIGHT-READING WITH ITEM 7 NOMENCLATURE.
9. ITEM 20 CONSISTS OF MOUNTING HARDWARE FOR HANDLES AND ASSOCIATED PARTS. DISCARD UNUSED HARDWARE SUPPLIED WITH ITEM 20.
10. ITEM 19 CONSISTS OF ONE (1) BOTTOM HANDLE, MOUNTING BLOCK AND ASSOCIATED PARTS. ITEM 19 IS THE SAME AS ITEM 18, BUT ITEM 19 IS FOR THE TOP.

| REV | DESCRIPTION | DATE | APPROVED |
|---|---|---|---|
| A | DOCUMENT CONTROL RELEASE | | |
| | REVISED PER ECO NO. | | |
| | REVISED PER ECO NO. | | |
| | REVISED PER ECO NO. | | |
| | REVISED PER ECO NO. | | |
| | REVISED PER ECO NO. | | |
| | REVISED PER ECO NO. | | |

407692-002 A



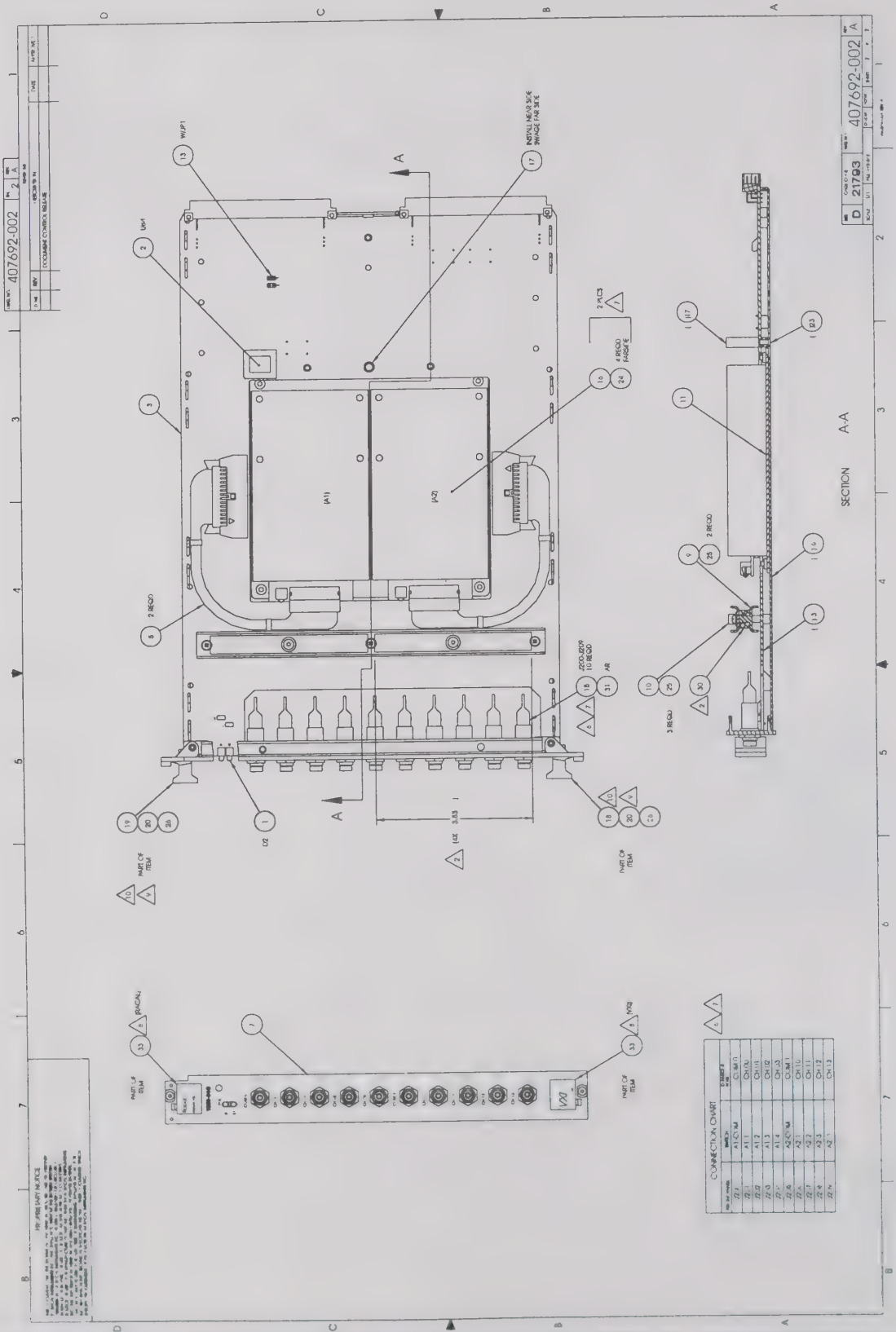

SEE SEPARATE PARTS LIST

RACAL Instruments, Inc.
4 Goodyear St. Irvine, CA 92718-2512

1260-84B-1,2
1X4 OPT SW,1SL

D | 21793 | 407692-002 | A

SCALE 1/2 | SHEET 1 OF 2


407692-002
D 21793
407692-002
SECTION A-A
CONNECTION CHART

DWG. NO. 405148 SH 1 REV A

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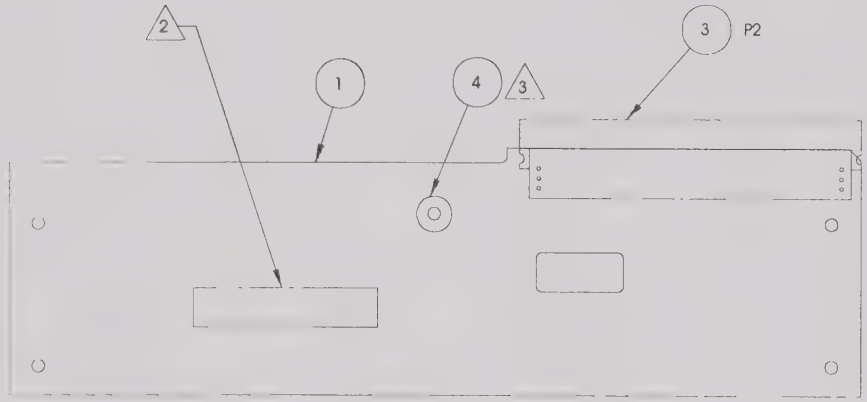
REVISIONS

| ZONE | REV | DESCRIPTION | DATE | APPROVED |
|---|---|---|---|---|
| | | DOCUMENT CONTROL RELEASE | | |
| | | REVISED PER EO NO. | | |
| | | REVISED PER EO NO. | | |
| | | REVISED PER EO NO. | | |

NOTES:

1. REFERENCE SCHEMATIC 435148.
2. INK STAMP ASSEMBLY NUMBER & CURRENT REVISION LETTER APPROXIMATELY WHERE SHOWN.
3. INSTALL FROM COMPONENT SIDE, SWAGE ON CIRCUIT SIDE.




COMPONENT SIDE SHOWN

| QTY | CAGE CODE | PART OR IDENTIFYING NO. | NOMENCLATURE OR DESCRIPTION | REFERENCE OR MATERIAL SPEC. | ZONE | ITEM |
|---|---|---|---|---|---|---|
| 1 | | 611263 | STS04B.062P.775L.250 | | | 4 |
| 1 | | 601675-001 | CON-PCB-PLG096P.100D | P2 | | 3 |
| REF | | 435148 | SCHEMATIC,L-BUS JUMPER | | | 2 |
| 1 | | 415148 | PCB,L-BUS JUMPER | | | 1 |

PARTS LIST

RACAL Instruments, Inc.
4 Goodyear St., Irvine, CA 92718-2002

TITLE
PCB ASSY,L-BUS JUMPER

| SIZE | CAGE CODE | DWG NO. | REV |
|---|---|---|---|
| B | 21793 | 405148 | A |

SCALE NONE CALC WT ACT WT SHEET 1 OF 1

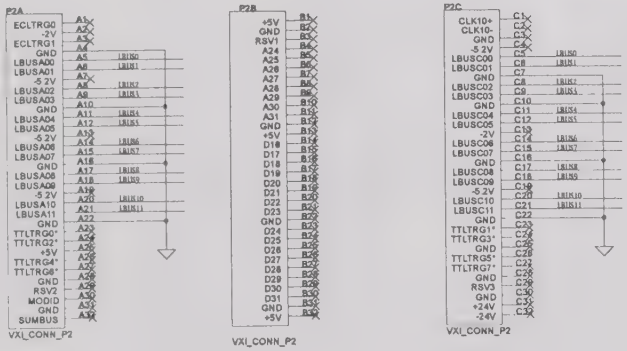
980340 REV. F

| DWG. NO. 435148 | SH. 1 | REV. A |
|---|---|---|

REVISIONS

| REV | DESCRIPTION | DATE | APPROVED |
|---|---|---|---|
| A | DOCUMENT CONTROL RELEASE | | |
| | REVISED PER EO NO. | | |
| | REVISED PER EO NO | | |
| | REVISED PER EO NO. | | |

NOTES:




# VXI LBUS JUMPERS

CAD CURRENT REV LTR
FOR SHEET 1
REVISION A
DRAWN WITH PROTEL 99
VERSION 4.2.0

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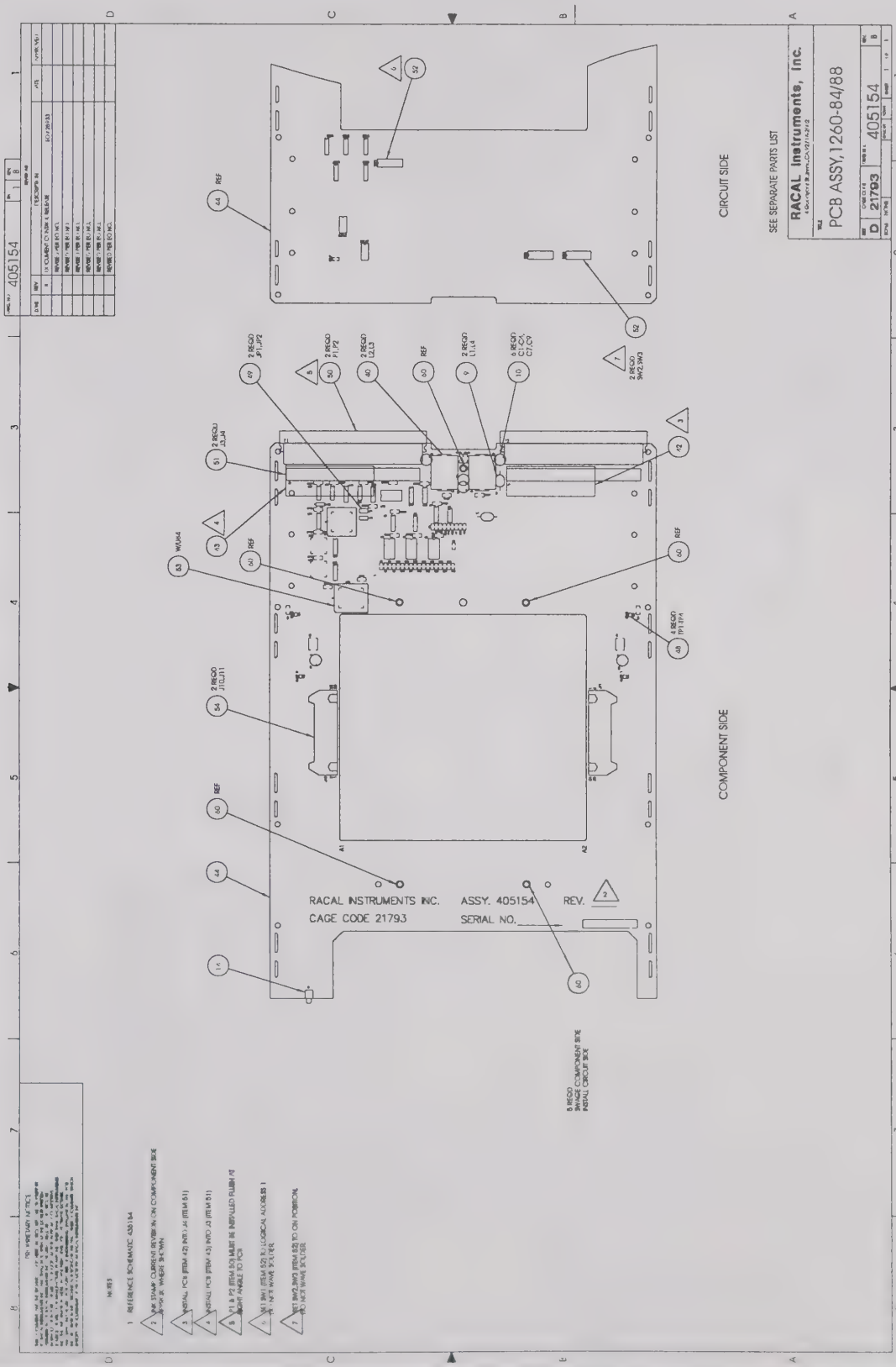
RACAL Instruments, Inc.
4 Goodyear St., Irvine, CA. 92618

TITLE
SCHEMATIC, L-BUS JUMPER

| SIZE | CAGE CODE | DWG NO. | REV. |
|---|---|---|---|
| B | 21793 | 435148 | A |

SCALE NONE | 27-Apr-1999 | SHEET 1 OF 1

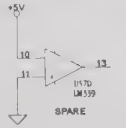

RACAL INSTRUMENTS INC.
CAGE CODE 21793
ASSY. 405154
SERIAL NO.
REV.
CIRCUIT SIDE
COMPONENT SIDE
SEE SEPARATE PARTS LIST
RACAL Instruments, inc.
PCB ASSY,1260-84/88
405154
21793

| DWG. NO. 435154 | SH. 1 | REV. A |
|---|---|---|

## NOTES:

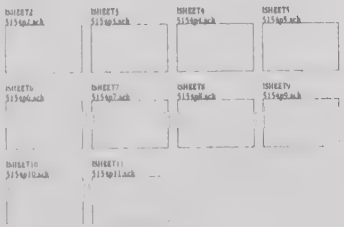
1. CAPACITOR VALUES ARE IN MICROFARADS, 50V, +/-20% UNLESS OTHERWISE SPECIFIED
2. RESISTOR VALUES ARE IN OHMS, 1/16W, +/-5% UNLESS OTHERWISE SPECIFIED
3. RESISTOR NETWORK VALUES ARE IN OHMS, +/-2%
4. PARTS INDICATED ARE NOT INSTALLED
5. PARTS INDICATED ARE INSTALLED FOR ASSYS 1260-84B AND 1260-88B ONLY

## UNUSED GATES




## REVISIONS

| REV | DESCRIPTION | DATE | APPROVED |
|---|---|---|---|
| A | DOCUMENT CONTROL RELEASE | | |
| | REVISED PER EO NO. | | |
| | REVISED PER EO NO. | | |
| | REVISED PER EO NO. | | |




| REFERENCE DESIGNATOR | DEVICE TYPE | POWER PINS | | |
|---|---|---|---|---|
| | | +5V PIN | +12V PIN | GND PIN |
| U3,5,6 | 74HCT273 | 20 | | 10 |
| U1,2,4,60,88 | 74HCT166 | 16 | | 8 |
| U7 | 74AHCT00 | 14 | | 7 |
| U53 | 231153-002 (16R4) | 20 | | 10 |
| U54 | 74HCT138 | 16 | | 8 |
| U56 | 74HCT85 | 16 | | 8 |
| U57 | LM339 | 3 | | 12 |
| U61,62 | 74HCT164 | 14 | | 7 |
| U70 | 231152-004(18L8Q-25) | 20 | | 10 |
| U71,77 | 74HC253 | 16 | | 8 |
| U73,74 | 28LS32 | 16 | | 8 |
| U75 | 28LS31 | 16 | | 8 |
| U78 | 231154 (22V10) | 28 | | 14 |
| U82 | 74HC269 | 20 | | 10 |
| U84 | 27C256 | 32 | | 16 |
| U85,86,87 | 74LS161 | 16 | | 8 |

CAD CURRENT REV LTR
FOR SHEETS 1 THRU 11
REVISION A
DRAWN WITH PROTEL 99
VERSION 4.2.0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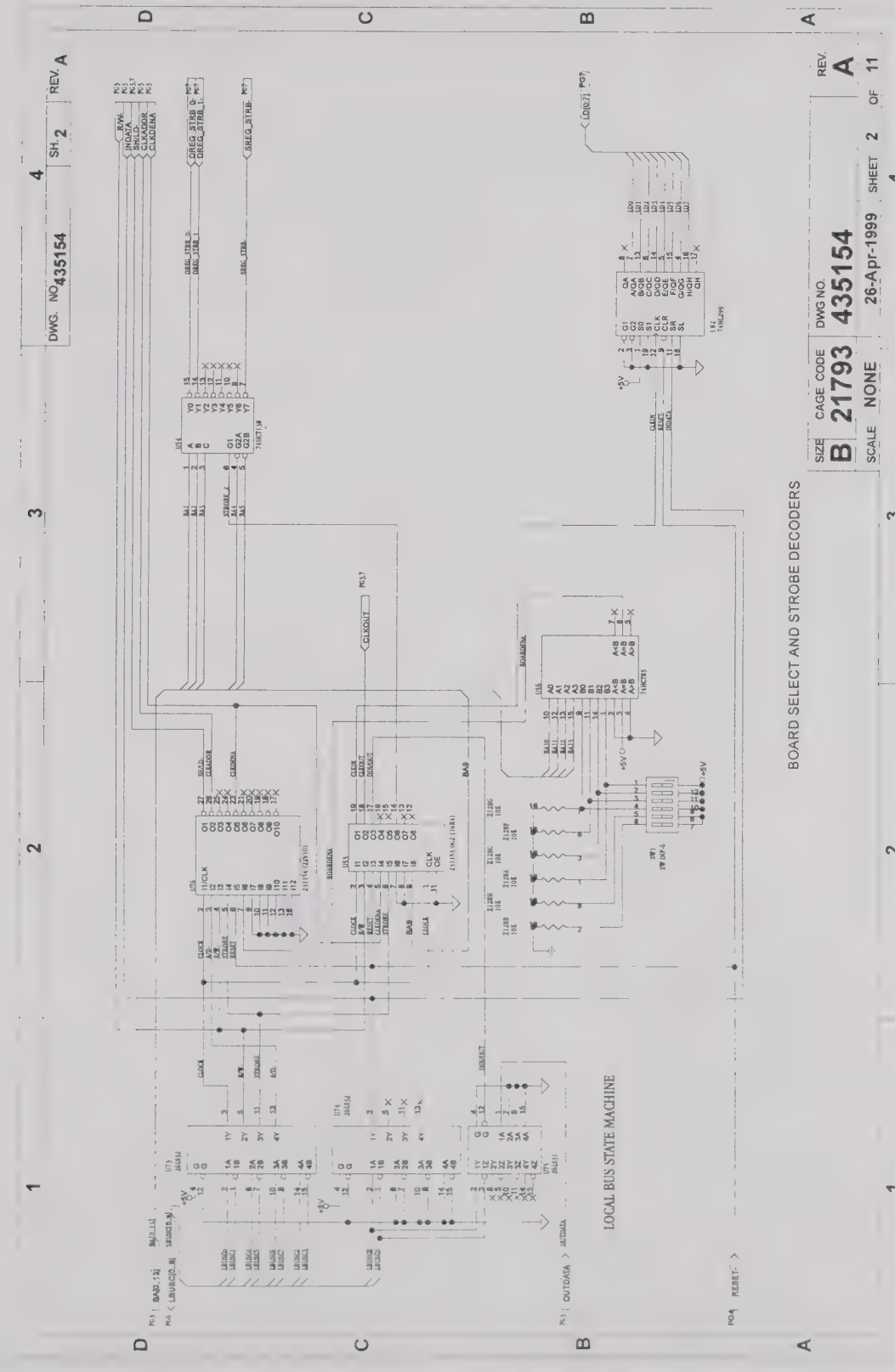
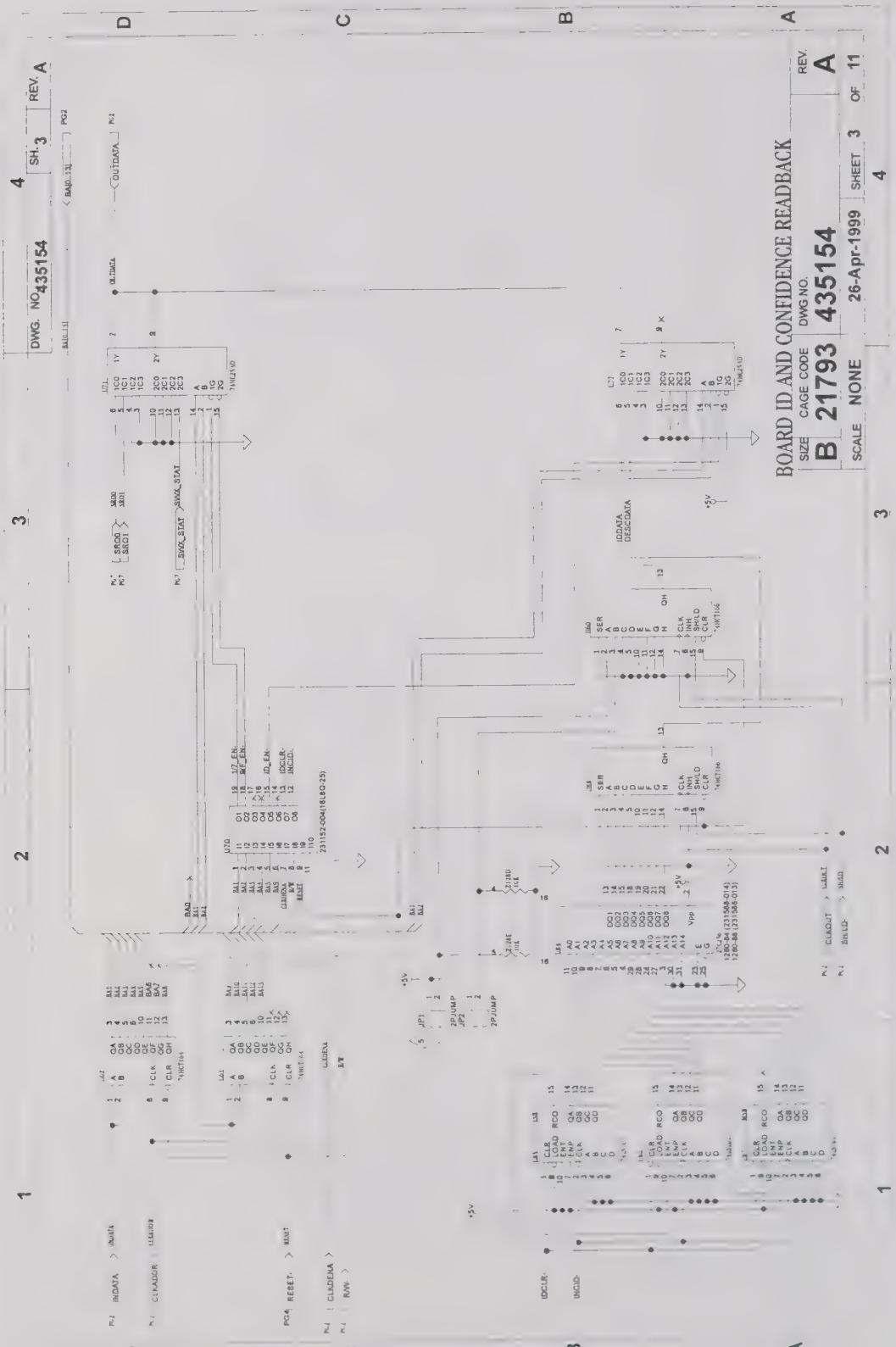
**RACAL Instruments, Inc.**
4 Goodyear St., Irvine, CA. 92618


TITLE
**SCHEMATIC, 1260-84/88**

| SIZE | CAGE CODE | DWG NO. | REV. |
|---|---|---|---|
| B | 21793 | 435154 | A |

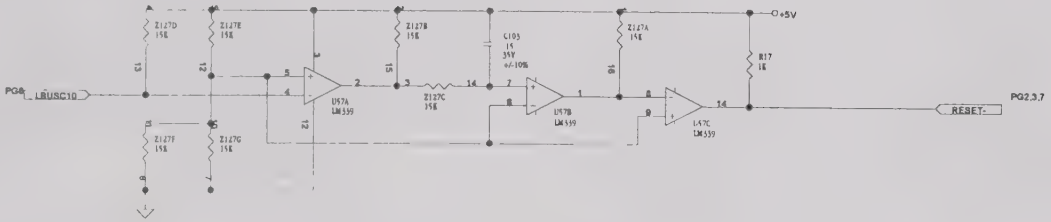
| SCALE | NONE | 26-Apr-1999 | SHEET 1 OF 11 |
|---|---|---|---|


BOARD SELECT AND STROBE DECODERS
LOCAL BUS STATE MACHINE
SIZE B
CAGE CODE 21793
DWG NO. 435154
REV. A
SCALE NONE
26-Apr-1999
SHEET 2 OF 11
DWG. NO 435154
SH. 2
REV. A


BOARD ID AND CONFIDENCE READBACK
SIZE B
CAGE CODE 21793
DWG NO. 435154
REV. A
SCALE NONE
26-Apr-1999
SHEET 3 OF 11
DWG. NO 435154
SH. 3
REV. A

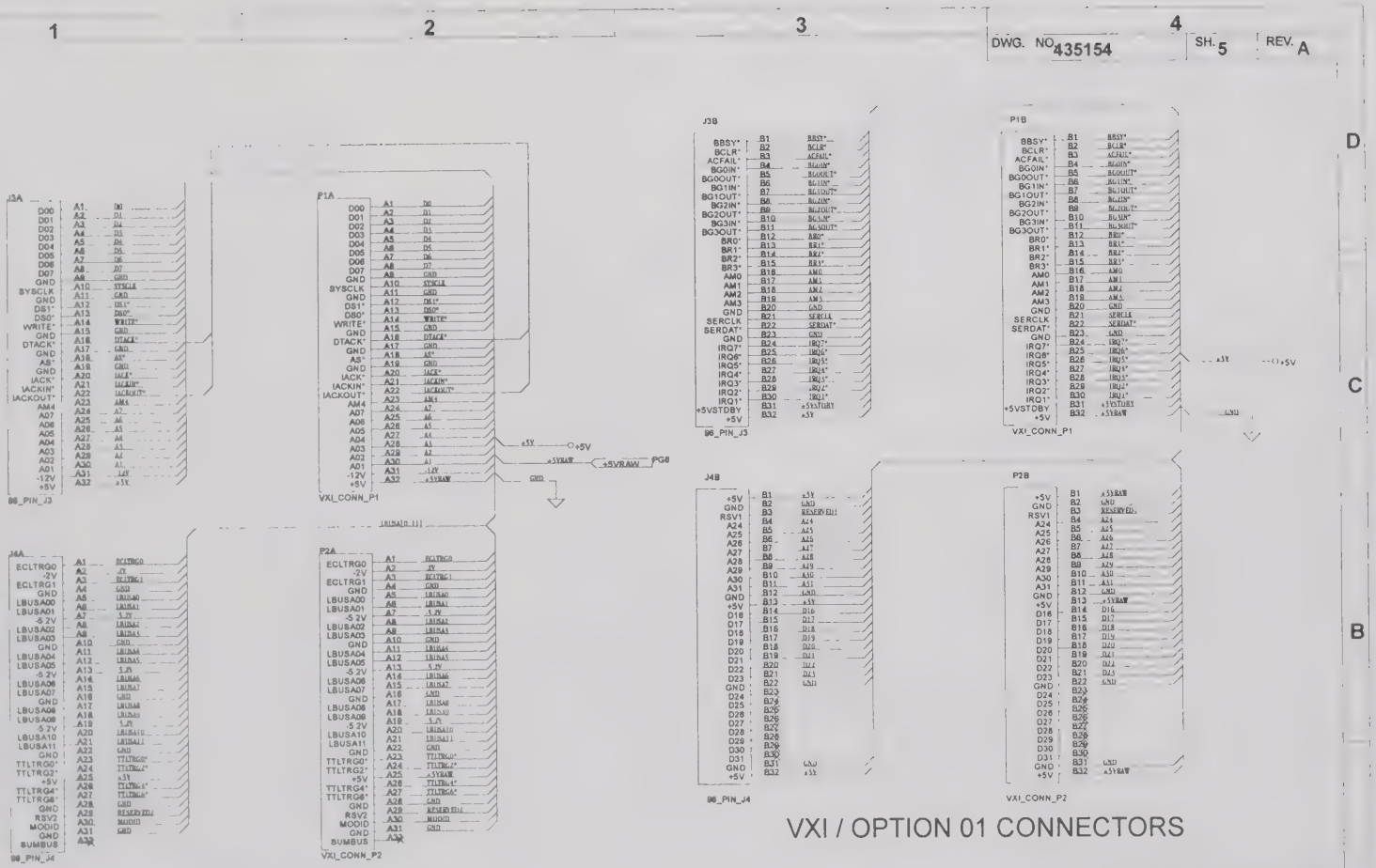
| 1 | 2 | 3 | 4 |
|---|---|---|---|

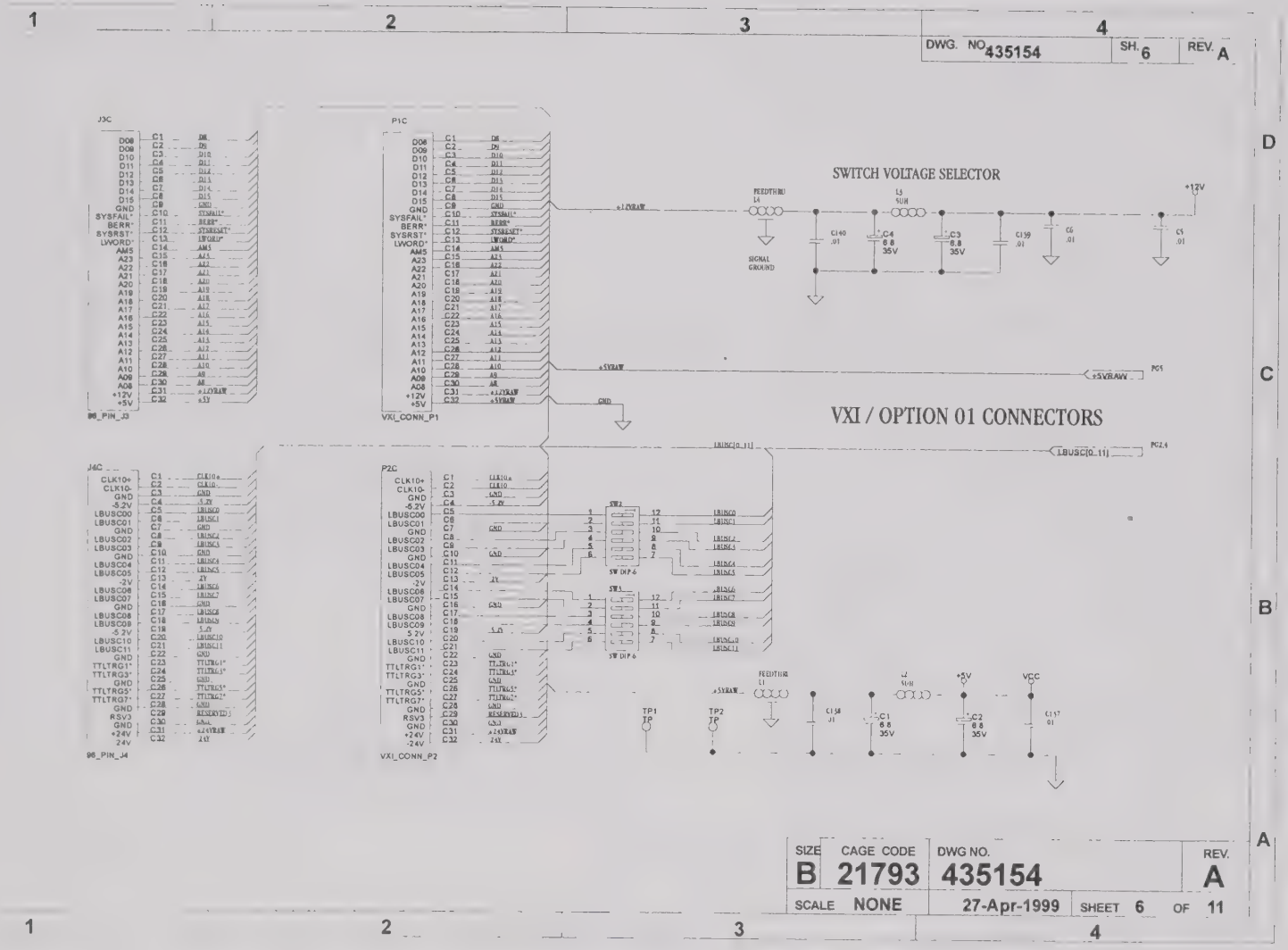
DWG. NO 435154 | SH. 4 | REV. A

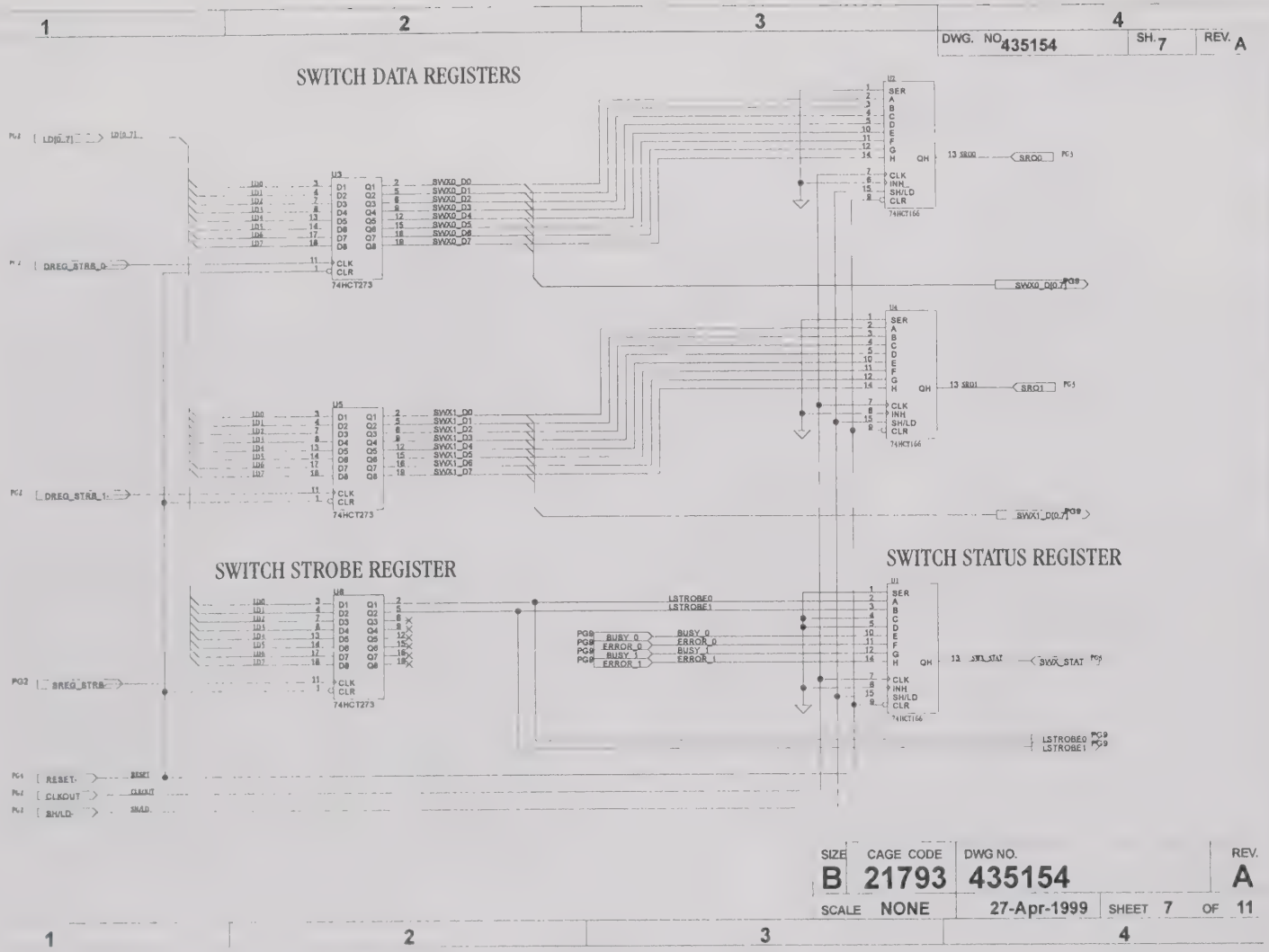



RESET CCT

| SIZE | CAGE CODE | DWG NO. | REV. |
|---|---|---|---|
| B | 21793 | 435154 | A |
| SCALE NONE | 26-Apr-1999 | SHEET 4 OF 11 | |

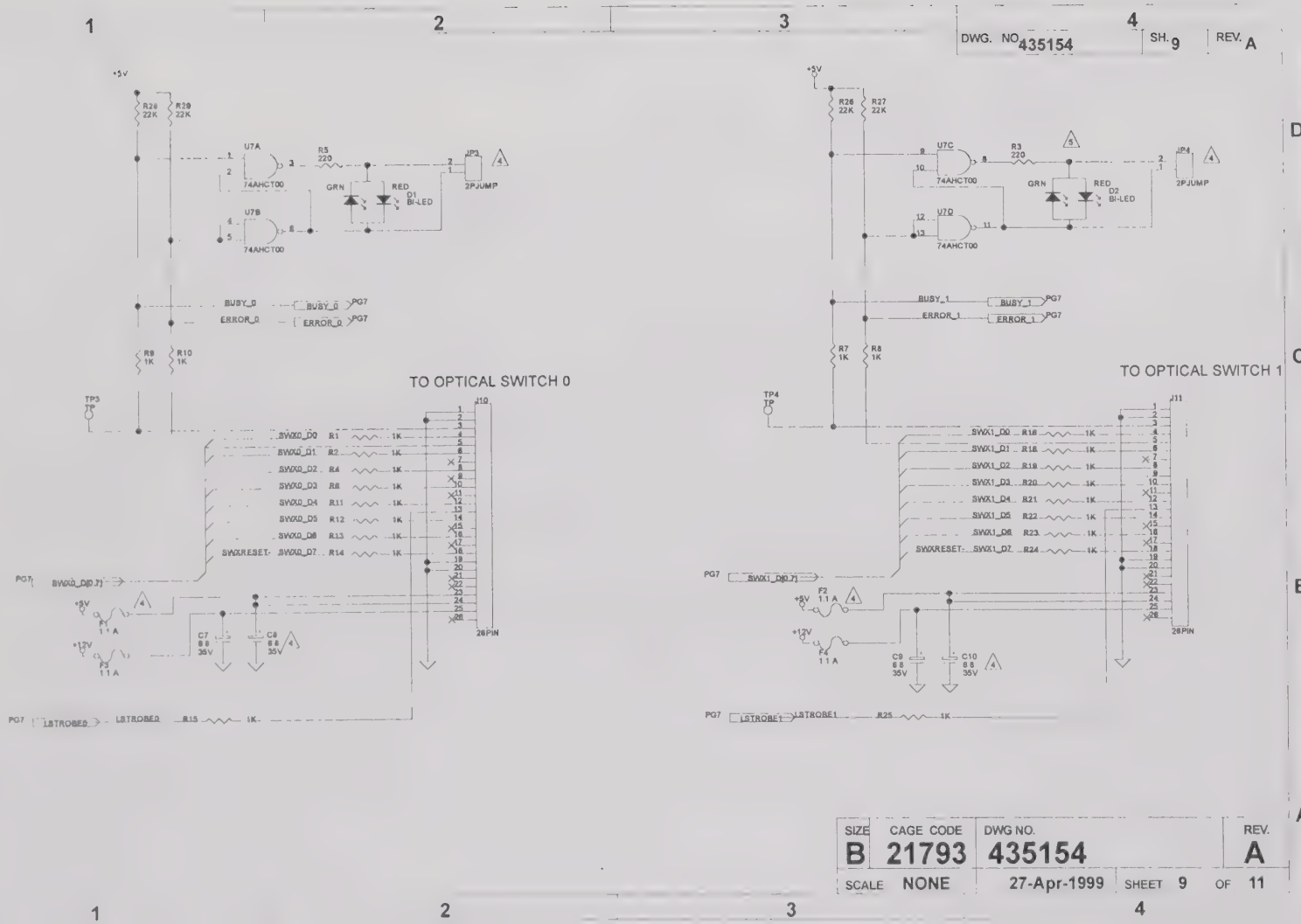

DWG. NO. 435154
SH. 5
REV. A
VXI / OPTION 01 CONNECTORS
VXI / OPTION 01 CONNECTORS
SIZE B
CAGE CODE 21793
DWG NO. 435154
REV. A
SCALE NONE
26-Apr-1999
SHEET 5 OF 11

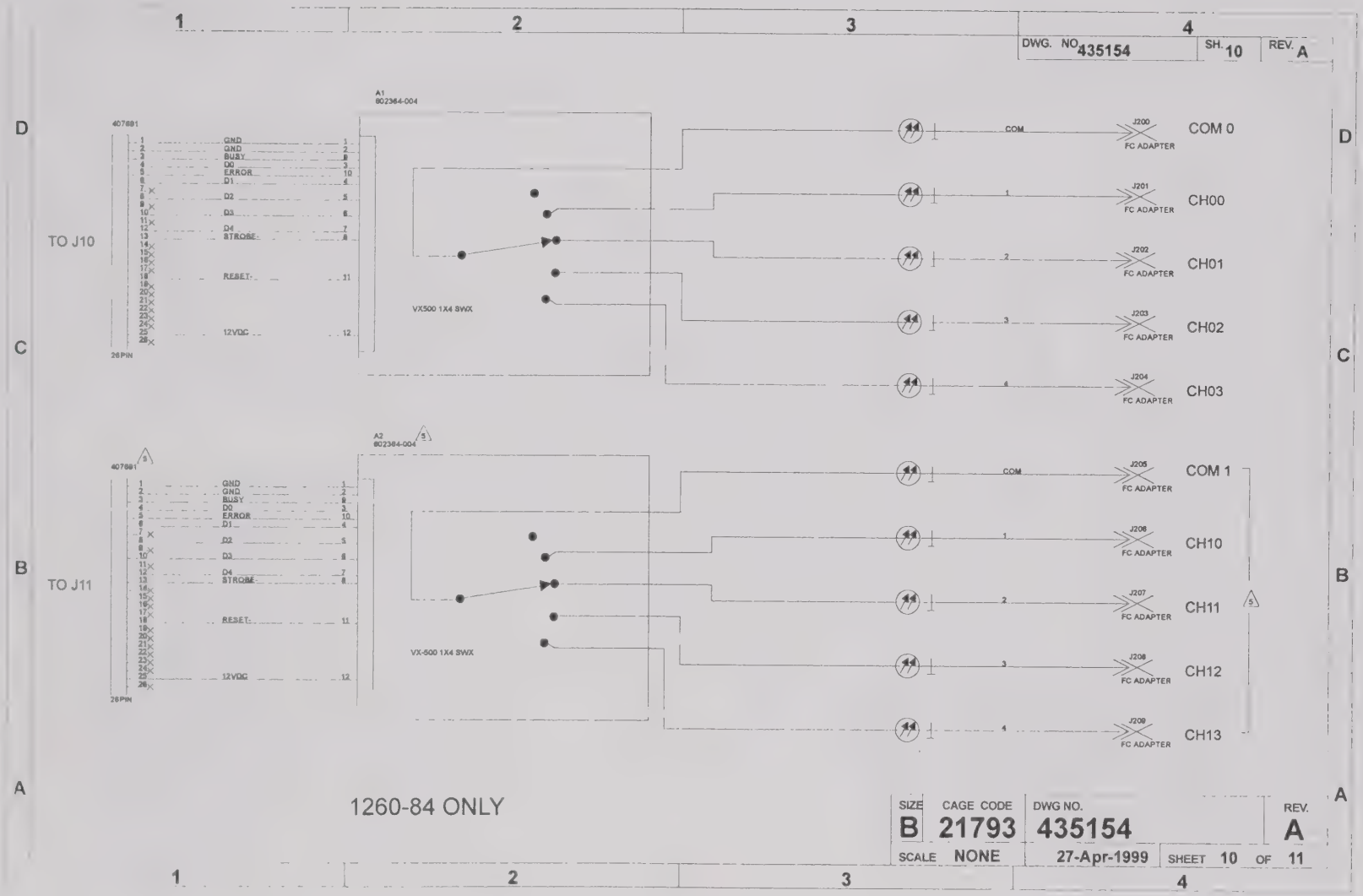

DWG. NO 435154
SH. 6
REV. A
SWITCH VOLTAGE SELECTOR
VXI / OPTION 01 CONNECTORS
SIZE B
CAGE CODE 21793
DWG NO. 435154
REV. A
SCALE NONE
27-Apr-1999
SHEET 6 OF 11


DWG. NO 435154
SH. 7
REV. A
SWITCH DATA REGISTERS
SWITCH STROBE REGISTER
SWITCH STATUS REGISTER
74HCT273
74HCT166
SIZE B
CAGE CODE 21793
DWG NO. 435154
REV. A
SCALE NONE
27-Apr-1999
SHEET 7 OF 11

DECOUPLING CAPACITORS

| SIZE | CAGE CODE | DWG NO. | REV. |
|---|---|---|---|
| B | 21793 | 435154 | A |
| SCALE NONE | 27-Apr-1999 | SHEET 8 OF 11 | |


DWG. NO 435154
SH. 9
REV. A
TO OPTICAL SWITCH 0
TO OPTICAL SWITCH 1
SIZE B
CAGE CODE 21793
DWG NO. 435154
REV. A
SCALE NONE
27-Apr-1999
SHEET 9 OF 11


DWG. NO 435154
SH. 10
REV. A
TO J10
TO J11
A1 802364-004
A2 802364-004
VX500 1X4 SWX
VX-500 1X4 SWX
GND
BUSY
D0
ERROR
D1
D2
D3
D4
STROBE
RESET
12VDC
26PIN
COM
FC ADAPTER
J200
J201
J202
J203
J204
J205
J206
J207
J208
J209
COM 0
CH00
CH01
CH02
CH03
COM 1
CH10
CH11
CH12
CH13
1260-84 ONLY
SIZE B
CAGE CODE 21793
DWG NO. 435154
REV. A
SCALE NONE
27-Apr-1999
SHEET 10 OF 11

DWG. NO 435154
SH. 11
REV. A
COM 0
CH00
CH01
CH02
CH03
CH04
CH05
CH06
CH07
COM 1
CH10
CH11
CH12
CH13
CH14
CH15
CH16
CH17
FC ADAPTER
VX-500 1X8 SHOC
TO J10
TO J11
1260-88 ONLY
SIZE B
CAGE CODE 21793
DWG NO. 435154
REV. A
SCALE NONE
27-Apr-1999
SHEET 11 OF 11

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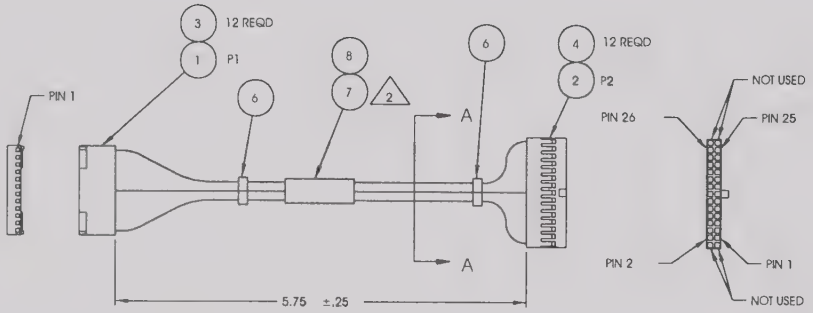
| REVISIONS | | | | |
|---|---|---|---|---|
| ZONE | REV | DESCRIPTION | DATE | APPROVED |
| | A | RELEASED PER DRN NO. | | |
| | | REVISED PER ECO NO. | | |
| | | REVISED PER ECO NO. | | |
| | | REVISED PER ECO NO. | | |

NOTES UNLESS OTHERWISE SPECIFIED.

1. SEE WIRE LIST FOR CONNECTIONS AND CONDUCTORS

2. MARK APPROPRIATELY SIZED YELLOW SHRINK TUBE WITH RACAL INSTRUMENTS PART NUMBER AND CURRENT REVISION LEVEL. USE PERMANENT BLACK INK. COVER MARKING WITH CLEAR SHRINK TUBING.




VIEW A-A
WIRING SIDE VIEW

| WIRE LIST | | | |
|---|---|---|---|
| FROM | TO | WIRE TYPE | SIGNAL |
| P1-1 602163-9016021 | P2-1 WIRE 24AWG, WHTGND 99-001 524999 | | |
| P1-2 602163-9016021 | P2-2 WIRE 24AWG, WHTGND 99-001 524999 | | |
| P1-3 602163-9016021 | P2-4 WIRE 24AWG, WHTD0 99-001 524999 | | |
| P1-4 602163-9016021 | P2-6 WIRE 24AWG, WHTD1 99-001 524999 | | |
| P1-5 602163-9016021 | P2-8 WIRE 24AWG, WHTD2 99-001 524999 | | |
| P1-6 602163-9016021 | P2-10 WIRE 24AWG, WHTD3 99-001 524999 | | |
| P1-7 602163-9016021 | P2-12 WIRE 24AWG, WHTD4 99-001 524999 | | |
| P1-8 602163-9016021 | P2-13 WIRE 24AWG, WHTSTROBE 99-001 524999 | | |
| P1-9 602163-9016021 | P2-3 WIRE 24AWG, WHTBUSY 99-001 524999 | | |
| P1-10 602163-9016021 | P2-5 WIRE 24AWG, WHTERROR 99-001 524999 | | |
| P1-11 602163-9016021 | P2-18 WIRE 24AWG, WHTRESET 99-001 524999 | | |
| P1-12 602163-9016021 | P2-25 WIRE 24AWG, WHT+12VDC 99-001 524999 | | |

| PARTS LIST | | | | | |
|---|---|---|---|---|---|
| QTY | CAGE CODE | PART OR IDENTIFYING NO. | NOMENCLATURE OR DESCRIPTION | REFERENCE OR MATERIAL SPEC | ZONE | ITEM |
| A/R | | M23053/5-107-C | TBG3RK PTFE 3X(8 +-CLEAR | MIL-I-23053 | | 8 |
| A/R | | M23053/5-107-Y | TBG3RK-POF.375D-YELLOW | MIL-I-23053 | | 7 |
| 2 | | 611897 | RE-CA-UG- UG2 1.25 | THOMAS+BETTS TK-24M | | 6 |
| A/R | | 524999 | WIRE-#TR24G-7/7W | ALPHA 5855/7 | | 5 |
| 12 | | 602199-001 | CONTACT,CRIMP,RECPT,24-22GA | BERG 48245-000 | | 4 |
| 12 | | 602163-001 | BRKTR-BNP-U-22 3.62 | MOLEX_76-65-0816 | | 3 |
| 1 | | 602372-030 | CON-CAB-RCPT,3C 1000-KEYED | BERG 65676-002 | | 2 |
| 1 | | 602371-126 | CON-PCB-PLG2X13,UG-LOW-PRO | MOLEX 22-01-3077 | | 1 |

| | | | |
|---|---|---|---|
| RACAL Instruments, Inc. 4 Goodyear St., Irvine, CA 92718-2002 | | | |
| TITLE: CABLE ASSY, INTFC, VX-500 SW | | | |
| SIZE: C | CAGE CODE: 21793 | DWG NO: 407691 | REV: A |
| SCALE: NONE | | SHEET 1 OF 1 | |

DWG NO. 407691 SH 1 REV A

# Chapter 5
# PARTS LIST


| | | |
|---|---|---|
| 407678 | Final Assy, 1260-84A-2 | 5-3 |
| 407678-001 | Final Assy, 1260-84B -2 | 5-4 |
| 407692-001 | Final Assy, 1260-84A-1 | 5-5 |
| 407692-002 | Final Assy, 1260-84B-1 | 5-6 |
| 405148 | PCB Assy, L-BUS Jumper | 5-7 |
| 405154 | PCB Assy, 1260-84/88 | 5-8 |
| 407691 | Cable Assy, Interface | 5-9 |

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RACAL INSTRUMENTS INC.

Assembly 407678

1260-84A-2, 1 1x4 OPT SW, 2SL Date 5/19/99 Revision A

| # | Component | Description | U/M | Qty Reqd | Ref |
|---|---|---|---|---|---|
| 2 | 231588-014 | ICMEM-27C256-15-U84-PLCCP | EA | 1.00000 | U8 4 |
| 3 | 405148 | PCB ASSY, L-BUS JUMPER | EA | 1.00000 | |
| 4 | 405154 | PCB ASSY, 1260-84/88 | EA | 1.00000 | |
| 5 | 407680 | SHIP KIT, 1260-84 | EA | 1.00000 | |
| 6 | 407691 | CABLE ASSY, INTFC,VX-500 SW | EA | 1.00000 | W/AI |
| 7 | 456715-001 | BRKT, L-BUS MOUNTING, TOP | EA | 1.00000 | |
| 8 | 456715-002 | BRKT, L-BUS MOUNTING, BOTTOM | EA | 1.00000 | |
| 9 | 456716 | COVER, RIGHT,L-BUS BYPASS,VXI | EA | 1.00000 | |
| 10 | 456722 | COVER, LEFT, VXI, MOD-ADDR | EA | 1.00000 | |
| 11 | 456731 | PANEL ASSY, FRONT, 1260-84A | EA | 1.00000 | |
| 12 | 456764 | CAP, REAR MODULE | EA | 1.00000 | |
| 13 | 456775-001 | BRKT, STRAIN RELIEF, LOWER, 2W | EA | 1.00000 | |
| 14 | 456776-001 | BRKT, STRAIN RELIEF, UPPER, 2W | EA | 1.00000 | |
| 15 | 456786 | PLATE, SWITCH MOUNTING | EA | 1.00000 | |
| 20 | 602362 | CONN, FIBER OPTIC,FC ADAPTER | EA | 5.00000 | J200-J204 |
| 21 | 602364~004 | SWITCH, OPTICAL, 1x4, SGL MODE | EA | 1.00000 | A1 |
| 22 | 611264 | HAN DLE-EXT-BOT | EA | 2.00000 | |
| 23 | 611265 | HANDLE-EXT-TOP | EA | 2.00000 | |
| 24 | 611266 | MOUNTING HDW, HANDLE | EA | 1.00000 | |
| 26 | 615541 | S1M-PFL1H004-40X.250 | EA | 21.00000 | |
| 27 | 615556 | S1M-PFL1H006~32X.250 | EA | 4.00000 | |
| 30 | 616252 | 53M-PPANHOO4-40X. 312 | EA | 13.00000 | |
| 31 | 616405 | S1MPFL9-M2.5x0. 45X12 | EA | 4.00000 | |
| 33 | 910634 | SPONGE, PRESSURE, SENSITIVE | FT | .00001 | |
| 35 | 920962 | LOCTITE-242-MED STR | EA | .00001 | |
| 36 | 921059 | LABEL-CAUTION-STATIC | EA | 1.00000 | |
| 37 | 921148-001 | LABEL SET, VXI | EA | 2.00000 | |
| 38 | 921309 | LABEL, VXI SWTCH IDENT. | EA | 1.00000 | |

**RACAL INSTRUMENTS INC.**

Assembly 407678-001

1260-84B-2, 2 1x4 OPT SW,2SL Date 5/19/99 Revision A

| # | Component | Description | U/M | Qty Reqd | Ref |
|---|---|---|---|---|---|
| 1 | 210155 | DILED-002.2V00.01A-RED/GRN | EA | 1.00000 | D2 |
| 2 | 231588-014 | ICMEM-27C256-15-U84-PLCCP | EA | 1.00000 | U84 |
| 3 | 405148 | PCB ASSY,L-BUS JUMPER | EA | 1.00000 | |
| 4 | 405154 | PCB ASSY, 1260-84/88 | EA | 1.00000 | |
| 5 | 407680 | SHIP KIT,1260-84 | EA | 1.00000 | |
| 6 | 407691 | CABLE ASSY,INTFC,VX-500 SW | EA | 2.00000 | W/A1, A2 |
| 7 | 456715-001 | BRKT, L-BUS MOUNTING, TOP | EA | 1.00000 | |
| 8 | 456715-002 | BRKT, L-BUS MOUNTING, BOTTOM | EA | 1.00000 | |
| 9 | 456716 | COVER, RIGHT, L-BUS BYPASS, VXI | EA | 1.00000 | |
| 10 | 456722 | COVER, LEFT, VXI, MOD-ADDR | EA | 1.00000 | |
| 11 | 456732 | PANEL ASSY, FRONT, 1260-84B | EA | 1.00000 | |
| 12 | 456764 | CAP,REAR MODULE | EA | 1.00000 | |
| 13 | 456775-001 | BRKT, STRAIN RELIEF, LOWER, 2W | EA | 1.00000 | |
| 14 | 456776-001 | BRKT, STRAIN RELIEF, UPPER, 2W | EA | 1.00000 | |
| 15 | 456786 | PLATE, SWITCH MOUNTING | EA | 1.00000 | |
| 19 | 601195 | PLUG-JUMPER-0. 1 CTR | EA | 1.00000 | W/JP1 |
| 20 | 602362 | CONN,FIBER OPTIC,FC ADAPTER | EA | 10.00000 | J200-J209 |
| 21 | 602364-004 | SWITCH, OPTICAL, 1x4, SGL MODE | EA | 2.00000 | Al, A2 |
| 22 | 611264 | HAN DLE-EXT-BOT | EA | 2.00000 | |
| 23 | 611265 | HAN DLE-EXT-TOP | EA | 2.00000 | |
| 24 | 611266 | MOUNTING HDW, HANDLE | EA | 1.00000 | |
| 26 | 615541 | S1M-PFL1H004-40X.250 | EA | 21.00000 | |
| 27 | 615556 | S1M-PFL1HOO6-32X. 250 | EA | 8.00000 | |
| 30 | 616252 | 53M-PPANHOO4-40X. 312 | EA | 13.00000 | |
| 31 | 616405 | S1MPFL9-M2.5x0.45X12 | EA | 4.00000 | |
| 33 | 910634 | SPONGE, PRESSURE, SENSITIVE | FT | .00001 | |
| 35 | 920962 | LOCTITE-242-MED STR | EA | .00001 | |
| 36 | 921059 | LABEL-CAUTION-STATIC | EA | 1.00000 | |
| 37 | 921148-001 | LABEL SET,VXI | EA | 2.00000 | |
| 38 | 921309 | LABEL, VXI SWTCH IDENT. | EA | 1.00000 | |

## RACAL INSTRUMENTS INC.

Assembly 407692-001 1260-84A-1, 1 1x4 OPT SW, 1SL Date 4/30/99 Revision A

| # | Component | Description | U/N | Qty Reqd | Ref |
|---|---|---|---|---|---|
| 2 | 231588-014 | ICMEM-27C2 56-15-U8 4-PLCCP | EA | 1.00000 | U84 |
| 3 | 405154 | PCB ASSY, 1260-84/88 | EA | 1.00000 | |
| 4 | 407680 | SHIP KIT,1260-84 | EA | 1.00000 | |
| 5 | 407691 | CABLE ASSY,INTFC,VX-500 SW | EA | 1.00000 | W/A1 |
| 6 | 456722 | COVER, LEFT, VXI , MOD-ADDR | EA | 1.00000 | |
| 7 | 456772 | PANEL, FRONT, 1S-S-1x4 | EA | 1.00000 | |
| 8 | 456773 | PANEL,RIGHT, 88-1 | EA | 1.00000 | |
| 9 | 456775 | BRKT, STRAIN RELIEF, LOWER, 1W | EA | 1.00000 | |
| 10 | 456776 | BRKT, STRAIN RELIEF, UPPER, 1W | EA | 1.00000 | |
| 11 | 456786 | PLATE, SWITCH MOUNTING | EA | 1.00000 | |
| 15 | 602362 | CONN,FIBER OPTIC,FC ADAPTER | EA | 5.00000 | J200-J204 |
| 16 | 602364-004 | SWITCH, OPTICAL, 1x4, SGL MODE | EA | 1.00000 | A1 |
| 17 | 611263 | STSO4B. 062P. 775L.250 | EA | 1.00000 | |
| 18 | 611264 | HAN DLE-EXT-BOT | EA | 1.00000 | |
| 19 | 611265 | HAN DLE-EXT-TOP | EA | 1.00000 | |
| 20 | 611266 | MOUNTING HDW, HANDLE | EA | .50000 | |
| 23 | 615541 | S1M-PFL1H004-40X.250 | EA | 17.00000 | |
| 24 | 615556 | S1M-PFL1H006-32X.250 | EA | 4.00000 | |
| 25 | 616252 | 53M-PPANHOO4-40X. 312 | EA | 5.00000 | |
| 26 | 616405 | S1MPFL9-M2 5x0. 45X12 | EA | 2.00000 | |
| 30 | 910634 | SPONGE, PRESSURE, SENSITIVE | FT | .00001 | |
| 31 | 920962 | LOCTITE-242-MED STR | EA | .00001 | |
| 32 | 921059 | LABEL-CAUTION- STAT IC | EA | 1.00000 | |
| 33 | 921148-001 | LABEL SET,VXI | EA | 1.00000 | |
| 34 | 921309 | LABEL,VXI SWTCH IDENT. | EA | 1.00000 | |

## RACAL INSTRUMENTS INC.

Assembly 407692-002 1260-84B-1, 2 1x4 OPT SW, 1SL Date 4/30/99 Revision A

| # | Component | Description | U/M | Qty Reqd | Ref |
|---|---|---|---|---|---|
| 1 | 210155 | DILED-002.2V00.01A-RED/GRN | EA | 1.00000 | D2 |
| 2 | 231588-014 | ICMEM-27C2 56-15-U8 4-PLCCP | EA | 1.00000 | U84 |
| 3 | 405154 | PCB ASSY,1260-84/88 | EA | 1.00000 | |
| 4 | 407680 | SHIP KIT,1260-84 | EA | 1.00000 | |
| 5 | 407691 | CABLE ASSY,INTFC,VX-500 SW | EA | 2.00000 | W/A1, A2 |
| 6 | 456722 | COVER, LEFT, VXI , MOD-ADDR | EA | 1.00000 | |
| 7 | 456771 | PANEL, FRONT, 1S-D-1x4 | EA | 1.00000 | |
| 8 | 456773 | PANEL,RIGHT, 88-1 | EA | 1.00000 | |
| 9 | 456775 | BRKT, STRAIN RELIEF, LOWER, 1W | EA | 1.00000 | |
| 10 | 456776 | BRKT, STRAIN RELIEF, UPPER, 1W | EA | 1.00000 | |
| 11 | 456786 | PLATE, SWITCH MOUNTING | EA | 1.00000 | |
| 13 | 601195 | PLUG-JUMPER-0. 1 CTR | EA | 1.00000 | W/JP1 |
| 15 | 602362 | CONN,FIBER OPTIC,FC ADAPTER | EA | 10.00000 | J200-J209 |
| 16 | 602364-004 | SWITCH,OPTICAL, 1x4,SGL MODE | EA | 2.00000 | A1, A2 |
| 17 | 611263 | STSO4B. 062P. 775L.250 | EA | 1.00000 | |
| 18 | 611264 | HAN DLE-EXT -BOT | EA | 1.00000 | |
| 19 | 611265 | HAN DLE-EXT-TOP | EA | 1.00000 | |
| 20 | 611266 | MOUNTING HDW, HANDLE | EA | .50000 | |
| 23 | 615541 | SIM-PFL1H004-40X.250 | EA | 17.00000 | |
| 24 | 615556 | S1M-PFL1H006-32X.250 | EA | 8.00000 | |
| 25 | 616252 | 53M-PPANHOO4-40X. 312 | EA | 5.00000 | |
| 26 | 616405 | SIMPFL9-M2 . 5x0 . 45X12 | EA | 2.00000 | |
| 30 | 910634 | SPONGE, PRESSURE, SENSITIVE | FT | .00001 | |
| 31 | 920962 | LOCTITE-242-MED STR | EA | .00001 | |
| 32 | 921059 | LABEL-CAUTION-STATIC | EA | 1.00000 | |
| 33 | 921148-001 | LABEL SET,VXI | EA | 1.00000 | |
| 34 | 921309 | LABEL,VXI SWTCH IDENT. | EA | 1.00000 | |

## RACAL INSTRUMENTS INC.

Assembly 405148 PCB ASSY, L-BUS JUMPER Date 1/28/99 Revision A

| # | Component | Description | U/M | Qty Reqd | Ref |
|---|---|---|---|---|---|
| | 415148 | PCB, L-BUS JUMPER | EA | 1.00000 | - |
| | 601675-001 | CON-PCB-PLG096P. 100D | E | 1.00000 | P2 |
| | 611263 | STS04B. 062P. 775L.250 | EA | 1.00000 | - |
| 2 | 435148 | SCHEMATIC, L-BUS JUMPER | EA | | - |

## RACAL INSTRUMENTS INC.

Assembly 405154 PCB ASSY, 1260-84/88 Date 5/20/99 Revision B

| # | Component | Description | U/M | Qty Regd | Ref |
|---|---|---|---|---|---|
| 1 | R-21-1801 | CPCH2-0010 . 0N0050V20 | EA | 22.00000 | CS, 6, 100-102 104-106, 108, 110, 113, 116-122,137-140 |
| 2 | 050000-102 | RSCH2-001. 00K. 06W005 | EA | 23.00000 | R1, 2, 4, 6-25 |
| 3 | 050000-221 | RSCH1-220 . OOH. 06W005 | EA | 2.00000 | R3, 5 |
| 4 | 050000-223 | RSCH2-022 .00K. 06W005 | EA | 4.00000 | R26, 27,28,29 |
| 5 | 080114 | RSNW2-015. OOOK16PO8R | EA | 1.00000 | Z127 |
| 8 | 080120 | RSNW2-010 . OOOK16P15R | EA | 1.00000 | Z128 |
| 9 | 100164 | CPFT1-0800 . 0P0050v | EA | 2.00000 | LI, 4 |
| 10 | 110126 | CPTA3-0006. 8U0035V20 | EA | 6.00000 | CI, 2, 3, 4, 7, 9 |
| 13 | 130198 | CPCH2-0150 . 0N0035V10 | EA | 1.00000 | C103 |
| 14 | 210155 | DILED-002 . 2V00 . O1A-RED/GRN | EA | 1.00000 | DI |
| 17 | 231093 | ICLIN-LM339 COMP | EA | 1.00000 | U57 |
| 18 | 231096 | ICINT-2 6L532---RCVR | EA | 2.00000 | U73, 74 |
| 19 | 231119 | ICDIG-74HC299---SHFT | EA | 1.00000 | U82 |
| 20 | 231120 | ICDIG-7 4HCT1 66-SHFT | EA | 5.00000 | UI, 2, 4, 60, 88 |
| 22 | 231125 | ICINT-2 6L531---DRVR | EA | 1.00000 | U75 |
| 23 | 231130 | ICDIG-7 4HCT273-FLOP | EA | 3.00000 | U3, 5,6 |
| 24 | 231131 | ICDIG-74HCT164-SHFT | EA | 2.00000 | U61, 62 |
| 25 | 231135 | ICDIG-74HCT8 5 | EA | 1.00000 | U56 |
| 26 | 231147 | ICDIG-7 4HC2 53D--MUX | EA | 2.00000 | U71, 77 |
| 27 | 231152-004 | ICPLA-16L8Q-25-U70-PLCCP | EA | 1.00000 | U70 |
| 28 | 231153-002 | ICPLA-16R4-U53-PLCCP | EA | 1.00000 | U53 |
| 29 | 231154 | ICMEM-22V10-U52-PAL | EA | 1.00000 | U7 6 |
| 32 | 231386 | ICDIG-74L5161---- | EA | 3.00000 | U85, 86, 87 |
| 33 | 231445 | ICDIG-74HCT138--SQIC | EA | 1.00000 | U54 |
| 37 | 231596 | ICDIG-74AHCTOO--SOIC | EA | 1.00000 | U7 |
| 40 | 310193 | CKF1-SH005. 00U10. 1%I | EA | 2.00000 | L2, 3 |
| 42 | 401951 | PCB ASSY,L-BUS JUMPER,P4 | EA | 1.00000 | W/J4 |
| 43 | 401951-003 | PCB ASSY,BUS GRANT,JUMPER,P3 | EA | 1.00000 | W/J3 |
| 44 | 415154-001 | PCB, 1260-8XX | EA | 1.00000 | |
| 45 | 435154 | SCHEMATIC, 1260-84/88 | EA | | |
| 48 | 601197 | POST-TEST-. 025 SQ | EA | 4.00000 | TP1, TP2, TP3, TP4 |
| 49 | 601208-010 | CON-PCB-PLG02SD. 100S | EA | 2.00000 | JP1, JP2 |
| 50 | 601675 | CON-PCB-PLGO96S. 100T | EA | 2.00000 | P1, P2 |
| 51 | 601925 | CON-PCB-RCP96SD. 100T | EA | 2.00000 | J3, J4 |
| 52 | 601969 | SWITCH, DIP-6 POS, LOW | EA | 3.00000 | SWI-3 |
| 53 | 602068-032 | CON-SKT-RCPO32S. 050S | EA | 1.00000 | W/U84 |
| 54 | 602166 | CON-PCB-PLG026S. 100D | EA | 2.00000 | J1O, Jil |
| 60 | 611258-001 | STSO4T. 062P. 170L.218 | EA | 5.00000 | |
| 67 | 921421 | FUSE-01. 100A-030V | EA | 2.00000 | F3, 4 |

## RACAL INSTRUMENTS INC.

Assembly 407691 CABLE ASSY, INTFC, VX-500 SW Date 4/15/99 Revision B

| # | Component | Description | U/M | Qty Reqd | Ref |
|---|---|---|---|---|---|
| . | M23053/5-107-4 | TBGSRK-POF. 3751D-YELLOW | FT | .00001 | - |
| . | 524999 | WRTEF-STR24G-9-9-9 WHT | FT | .00001 | - |
| . | 602163-012 | CON-CAB-PLG0I2C.I00S | EA | 1.00000 | - |
| . | 602163-901 | TRMCRP-SNP-U-F22-30G | EA | 12.00000 | - |
| . | 602199-001 | CONTACT, CRIMP, RECPT, 28-22GA | EA | 12.00000 | - |
| . | 602372-030 | CON-CAB-RCPO3OC. 100D-KEYED | EA | 1.00000 | - |
| . | 610897 | TIE-CA-LKG-. 062-1.25 | EA | 2.00000 | - |
| 8 | M23053/8-007-C | TBGSRK-POF.3801D-CLEAR | FT | .00001 | - |

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# Chapter 6

# PRODUCT SUPPORT

## Product Support

Racal Instruments has a complete Service and Parts Department. If you need technical assistance or should it be necessary to return your product for repair or calibration, call 1-800-722-3262. If parts are required to repair the product at your facility, call 1-949-859-8999 and ask for the Parts Department.

When sending your instrument in for repair, complete the form in the back of this manual.

For worldwide support and the office closes to your facility, refer to the Support Offices section on the following page.

## Reshipment Instructions

Use the original packing material when returning the 1260-84 to Racal Instruments for calibration or servicing. The original shipping crate and associated packaging material will provide the necessary protection for safe reshipment.

If the original packing material is unavailable, contact Racal Instruments Customer Service for information.

# Support Offices

**Racal Instruments, Inc.**
4 Goodyear St., Irvine, CA 92718-2002
Tel: (800) 722-3262, FAX: (949) 859-7309

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**Racal Systems Electronique S.A.**
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Tel: +33 (1) 3955 8888; FAX: +33 (1) 3955 6735

**Racal Systems Elettronica s.r.l.**
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Tel: +39 (02) 5750 1796; FAX +39 (02) 5750 1828

**Racal Elektronik System GmbH.**
Technologie Park Bergisch Gladach Friedrich-Ebert-Strasse
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**Racal Australia Pty. Ltd.**
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Unit 5, 25F., Mega Trade Center, No 1, Mei Wan Road, Tsuen
Wan, Hong Kong, PRC
Tel: +852 2405 5500, FAX: +852 2416 4335

# Appendix A

## Channel to Control Bit Mapping

| Switch Data Register 0 | Channel Descriptor | Connector Channel | Connector Channel |
|---|---|---|---|
| $00_{16}$- $7f_{16}$ | 04 | COM 0 | No Connection |
| $80_{16}$ | 00 | COM 0 | 00 |
| $81_{16}$ | 01 | COM 0 | 01 |
| $82_{16}$ | 02 | COM 0 | 02 |
| $83_{16}$ | 03 | COM 0 | 03 |

| Switch Data Register 1 | Channel Descriptor | Connector Channel | Connector Channel |
|---|---|---|---|
| $00_{16}$-$7f_{16}$ | 14 | COM 1 | No Connection |
| $80_{16}$ | 10 | COM 1 | 10 |
| $81_{16}$ | 11 | COM 1 | 11 |
| $82_{16}$ | 12 | COM 1 | 12 |
| $83_{16}$ | 13 | COM 1 | 13 |

# Appendix B

**1260-84 Address Map**

| Address Offset | Data | | | | | | | | Register Description |
|---|---|---|---|---|---|---|---|---|---|
| $00f_{16}$ | ERR 1 | BUSY 1 | ERR 0 | BUSY 0 | X | X | STRB 1 | STRB 0 | Switch Strb/Status |
| $003_{16}$ | D7 | D6 | D5 | D4 | D3 | D2 | D1 | D0 | Switch Data 1 |
| $001_{16}$ | D7 | D6 | D5 | D4 | D3 | D2 | D1 | D0 | Switch Data 0 |

Note: the Actual Address is:

A24 Base Address + ($400_{16}$ X Module Address) + Address Offset

# Appendix C

## Maintenance of Fiberoptic Cables and Connectors

### *Handling Fiberoptic Cables*

Optical cables should be handled with care to avoid cable damage and minimize the optical loss. The minimum bend radius for most optical cables is 35 mm (1.4 inches). Never bend an optical cable more sharply than this specification. Optical performance will degrade and the cable may break.

- Avoid bending any optical cable near a cable strain relief boot. Bending an optical cable near a strain relief boot is one of the easiest ways to permanently damage the optical fiber.
- Avoid bending any optical cable over a sharp edge.
- Avoid using cable tie wraps to hold optical cable. Tie wraps when tightened can create micro-bends or break an optical cable. Microbends can cause a dramatic reduction in optical performance.
- Do not pull on the bare fiber as this can break the fiber inside the optical switches.
- Avoid using soldering irons near any optical cable. Accidental damage can easily occur when an optical cable is used near a soldering iron. In addition, solder splatter can contaminate and permanently damage optical fiber connectors.
- In order to obtain the most stable, repeatable optical performance, immobilize optical cables using wide pieces of tape or some form of mechanical cushion after the optical cables have been connected.

### *Storing Optical Connectors*

The 1260-84 is shipped with dust caps in place covering all Front Panel optical connector adapters. These optical connector adapters should remain covered at all times when the instrument is not in use.

### *Cleaning Optical Connectors*

Clean any mating connector to the 1260-84 using a cleaning kit supplied by the connector manufacturer or high-grade isopropyl alcohol and a cotton swab. To clean with alcohol and a swab, soak the tip of a cotton swab in alcohol and then shake off any excess alcohol. The tip should be moist, not dripping wet. Stroke the swab tip gently across the surface of the connector and around the connector ferrule. Either allow the connector a minute to dry, or blow dry the connector using compressed air. Be careful when using compressed air because improper use may deposit a spray residue.

If the 1260-84 optical performance appears degraded, the optical ports may be dirty. Cleaning of the optical ports can be accomplished by the use of a 2.5mm foam swab (FIS P/N F1-0005 or equivalent) and isopropyl alcohol. If a 2.5mm foam swab is not available, cleaning the optical port requires the following steps:

1. Remove power from the 1260-84 and remove it from the chassis.
2. Use a Phillips screw driver to remove the screws that secure the 1260-84 top cover.
3. Unscrew the front panel locknut on the adapter and remove the adapter and connector.
4. Carefully unscrew the switch connector from the bulkhead adapter. Be careful not to bind the fiber. Refer to the figure below.

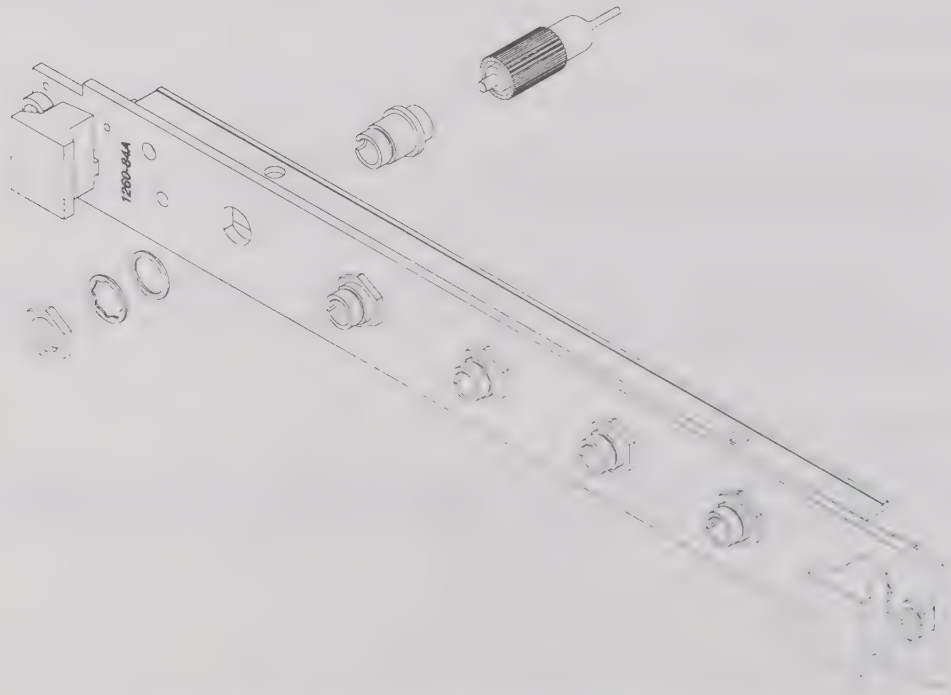


**Figure C-1, Cleaning the Optical Connectors**

5. Clean the ferrule tip of the connector using the steps described above.

6. Apply a small drop of medium strength loctite (242) to the adapter threads.

7. After cleaning reinstall the connector to the bulkhead adapter finger tight only. DO NOT overtighten.

NOTE: To minimize the amount of cleaning keep the provided dust caps on any adapters that are not being used.

### *Mating Optical Connectors*

- Clean both connectors prior to mating. Any small particles trapped during the mating process can permanently damage the connector.

- If possible, measure optical power throughput while mating connectors.

- Align the connector key with the adapter and insert the connector ferrule into the front panel adapter smoothly. Do not allow the fiber tip to contact any surface. If the tip accidentally contacts a surface before mating, *stop.* Re-clean the connector and try again.

- Tighten the connector until it is finger tight, or to the torque specified by the connector manufacturer. Do not over-tighten the connector as this can lead to optical loss and connector damage.

- Check the optical insertion loss. If the loss is unacceptable, Remove the connector, re-clean both ends of the mate, and reconnect. You may have to repeat this process several times before a low-loss connection is made.

- After you make the connection, monitor the stability of the optical throughput for a few minutes. Optical power trending (slowly increasing or decreasing) is caused by the slow evaporation of alcohol trapped in the connection. Continue to monitor optical power until it stabilizes. If the loss is unacceptable, re-clean the connectors and start again.

# Appendix D

# PERFORMANCE VERIFICATION

## Equipment List

Racal 1261B Mainframe or any VXI C-size or D-size mainframe with a minimum cooling capacity of 1.0 liters/sec (at 0.12 mm $H_2O$; see the Installation Instructions, Chapter 2 in this manual. Set the 1260-84 module address to 1, see the 1260-84 side panel label for details.

A VXI slot-0 controller and/or Resource Manager

A software utility to send and receive VXI, message-based commands and queries to a VXI device.

Averaging Optical Power Meter with the following requirements:

- ±0.01dB resolution
- ±0.005dB stability
- 80dB sensitivity
- Relative dB level to arbitrary reference capability
- Sensitive (>80dB range) at 1300 nm or 1550 nm

A Stable Optical Source with the following requirements:

- Greater than 0.01dB stability over 1 minute
- Output greater than 1 mW of optical power into the fiber type of the 1260-84
- Wavelength of 1300 ±120 nm or 1550 ±120 nm for testing

Two fiber optic jumper cables, 9 μm core, single mode.

## Power Up

1. Insert the 1260-84 into a powered-down VXI Mainframe (see the option 01T Users Manual)

   Make certain that the 1260-84 is securely inserted into the mainframe.

2. Turn the VXI mainframe power on.

   A few seconds are required after mainframe power-up before the slot-0 resource manager deasserts system reset and the 1260-84 Fail LED (Red) lights momentarily, then turns off.

3. Execute the resource manager software to configure the VXI system. The optical switch status LED's (Green) will turn off.

## Front Panel LEDs

***NOTE:***

**Whenever the optical switches in the 1260-84 are accessed over the VXI Bus the green STATUS LED on the front panel should light briefly. The length of time the LED is lighted is relatively short (tenths of seconds), depending on the speed of the switch, but it is usually observable by the user.**

1. Check that the STATUS LED's (green) light momentarily when closing a path on the optical switch.

## Switch Isolation

1. Send the command **CLOSE(@1(08,18))**; this causes the optical switches to go to the reset or off state.

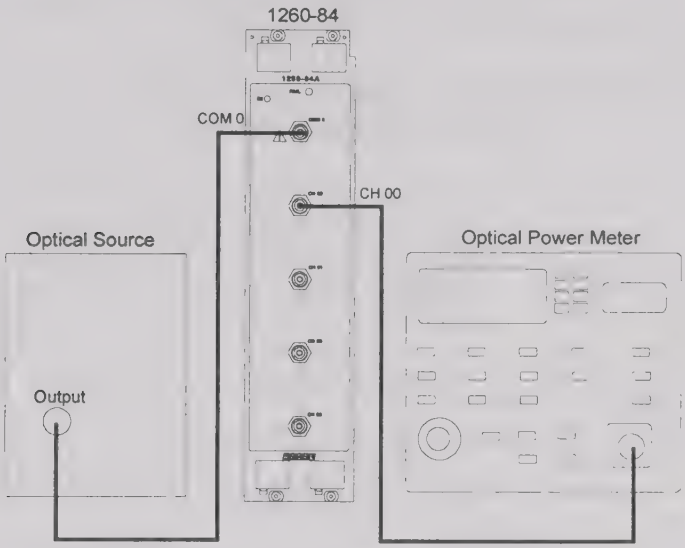


**Figure D-1, Setup for Switch Disable Procedure**

2. If you have not already done so, connect an optical source to the COM 0 input of the 1260-84 using a single mode optical fiber jumper cable.

   The source should be relatively stable (>0.1 dB stability over 1 minute) and should emit at least 1 mW of optical power into the fiber jumper used for input to the 1260-84. The source must emit light at a wavelength within the specification of the 1260-84 (1290 nm to 1570 nm).

   An average optical power meter is required. The meter should be able to accept the fiber of the jumpers being used.

3. Before continuing, cap the input to the Optical Power Meter and properly zero the meter.

4. Send the command **CLOSE (@1(00))**. This closes the optical path to channel 0.

5. Connect a fiber of equal or greater core diameter than 1260-84 to the channel 00 of the 1260-84.

6. Connect the other end of the fiber jumper to the input of the Optical Power Meter.

7. Record the power reading from the Optical Power Meter as $\mathbf{P_0}$.

8. If a relative dB mode is available on the Power Meter, set the dB reference level of the Power Meter to the measured $\mathbf{P_0}$ value.

9. Send the command **CLOSE (@1, (08))** to open the optical path for maximum isolation.

10. Record the new reading of the Optical Power Meter as $P_f$; if the dB relative mode is available, then record the new reading's value relative to the $P_0$=0 dB reference. If $P_f$ is ≤0.00, substitute 1 X $10^{-14}$ W for $P_f$. If the Relative dB mode is not available, the relative dB is calculated as

    $$\textit{Relative Attenuation (dB)} = 10 \times \log \frac{P_f}{P_0}$$

    The Relative Attenuation should be > 80 dB lower; that is, the power meter in relative mode should read less than –80 dB (eg. –89dB).

---

***NOTE:***

**Most Optical Power Meters cannot accurately measure at low power levels; consequently, the meter may simply display the lowest value it possibly can when the path is open.**

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11. Repeat steps 5 through 10 for the remaining channels.

12. Repeat steps 2 through 11 to verify a second switch if applicable.

## Insertion Loss

1. Send the command **CLOSE (@1(08))**; this causes the 1260-84 to go to the reset or off state.
2. Properly zero the Average Optical Power Meter to be used.
3. Send the command **CLOSE(@1(00))**; this closes the optical path for channel 00.

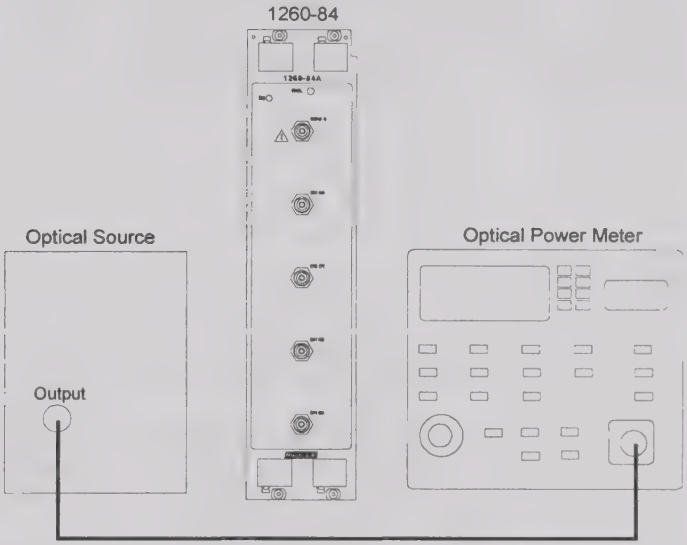


**Figure D-2, First setup for Insertion Loss Procedure**

4. If you have not already done so, connect an optical source to the input of the Average Optical Power Meter using a single mode optical fiber jumper cable.

   The source should be relatively stable (>0.1 dB stability over 1 minute) and should emit at least 1 μW of optical power into the fiber jumper used. The source must emit light at a wavelength within the specification of the 1260-84 (1290 nm to 1570 nm).

5. Record the power reading from the Optical Power Meter as $P_1$.

   If a relative –dB mode is available on the Power Meter, set the dB reference level of the Power Meter to the measured $P_1$ value.

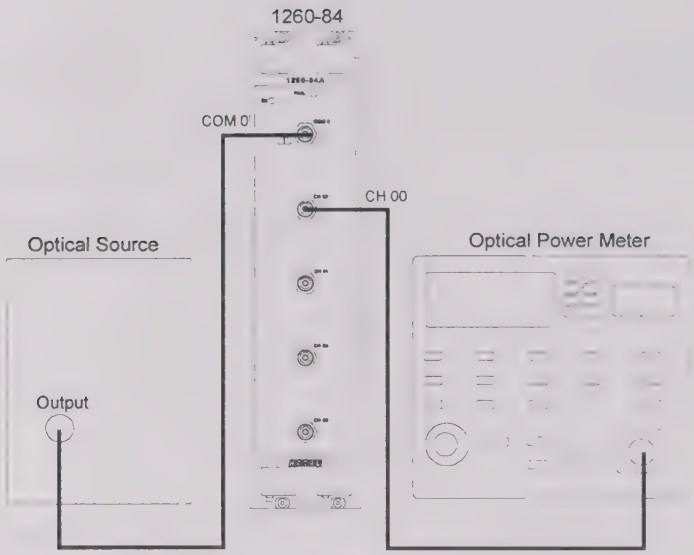


**Figure D-3, Second setup for Insertion Procedure**

6. If you have not already done so, attach the optical source to the COM 0 of the 1260-84 using the fiber jumper.

7. Attach the CH00 output of the 1260-84 to the Optical Power Meter using a fiber of greater than or equal core diameter compared to the 1260-84.

8. Record the new reading of the Optical Power Meter as $P_2$, if the dB relative mode is available, then record the new reading's value relative to the $P_1$=0 dB reference. If the Relative dB mode is not available, the relative dB Insertion Loss is calculated as:

   $$\textit{Insertion Loss (dB)} = -10 \times \log \frac{P_2}{P_1}$$

   The Insertion Loss should be less than 2.0dB (that is, less than 2.0dB Insertion Loss).

9. Repeat steps 3 through 8 for the remaining optical channels.

## Repeatability

*NOTE:*

**This test requires an Optical Source and an Average Optical Power Meter: In order to verify the repeatability of the 1260-84, the Optical Source and Power Meter must both be very stable (>0.01 dB); the repeatability of the measurement devices must be greater than the value being measured. It is necessary that the optical fibers used to carry the signal from the source, to the 1260-84, and then to the Power Meter are not disturbed or moved during this test.**

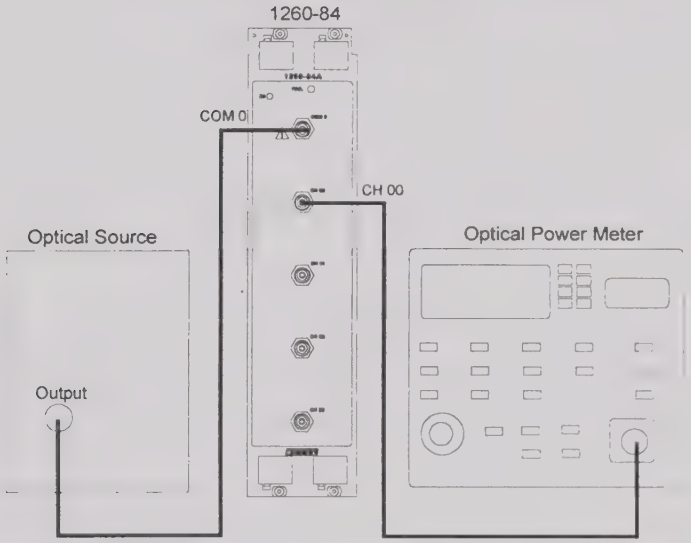


**Figure D-4, Setup for Repeatability and Accuracy Procedure**

1. Attach the stable source to the COM 0 of the 1260-84 and attach the CH 00 output of the 1260-84 to the Optical Power Meter using the appropriate fiber optic jumper cables. Be sure that the Power Meter wavelength setting matches the source wavelength.

2. Close Channel 00 by sending the command **CLOSE(@1(00))**.

3. Record the dB power level of the Power Meter for channel 00.

4. Close any other random channel (example: send the command **CLOSE(@1(01))**.

5. Close Channel 00 again by sending the command **CLOSE(@1(00))**.

6. Record the dB power level of the meter.

7. Repeat the procedure (steps4-6) for a new set of measurements, for as many times as required. Two repetitions are usually adequate.

8. Verify that the individual channel 00 readings do not vary by ±.03 dB.

9. Repeat the procedure, steps 1 through 8 for the remaining channels.

   **This verification assumes that the source has not drifted.**

Racal Instruments

## REPAIR AND CALIBRATION REQUEST FORM

To allow us to better understand your repair requests, we suggest you use the following outline when calling and include a copy with your instrument to be sent to the Racal Repair Facility.

Model_____Serial No._____Date_____

Company Name_____Purchase Order #_____

Billing Address_____

City

State/Province Zip/Postal Code Country

Shipping Address_____

City

State/Province Zip/Postal Code Country

Technical Contact_____Phone Number ( )_____
Purchasing Contact _____Phone Number ( )_____

1. Describe, in detail, the problem and symptoms you are having. Please include all set up details, such as input/output levels, frequencies, waveform details, etc.

_____
_____
_____
_____

2. If problem is occurring when unit is in remote, please list the program strings used and the controller type.

_____
_____
_____

3. Please give any additional information you feel would be beneficial in facilitating a faster repair time (i.e., modifications, etc.)

_____
_____
_____

4. Is calibration data required? Yes No (please circle one)

Call before shipping
Note: We do not accept "collect" shipments.

Ship instruments to nearest support office listed on back.

## Support Offices

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